Performance of Onion varieties in *Kharif* season for North Eastern Ghat Zone

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Abstract

Field experiment was conducted to study the effect different varieties on yield, yield attributing character of onion (*Allium cepa* L.) in RRTTS, G.Udayari of Kandhamal district of Odisha during 2020-2021 *kharif* season . Three improved onion varieties namly: Agri found Dark Red, Agrifound Light Red and AgrifoundWhite were tested in Randomized Complete Block Design (RBD) with five replications.. The results showed that the difference in variety had significant effect on all characters. Agrifound Dark Red variety gave significantly highest in plant height ,leaf number, average bulb weight and yield *i.e* 350qha^{-1} that exhibited 63% and 42% advantages on the dominantly produced varieties Agri found White and Agri found Light Red respectively.. Therefore, it is recommended for profitable onion.

Keywords: Onion, Variety, Yield

Introduction

Onion (*Allium cepa* L.) is one of the important bulb crops belonging to family Alliaceae and has gained the importance of a cash crop in recent years because of its very high export potential and grown throughout the world for its food and cuisinal value. Onion is characterized by its distinctive flavour and pungency, which is due to Allylpropyl-disulphide, a sulphur containing compounds found in the scales of the bulb.It is one of the most important and popular bulb crops cultivated commercially in nearly most parts of the world. Onions as food, medicine and religious object were known during the first Egyptian dynasty (3200 B.C.) (Ray and Yadav, 2005).). The red and yellow colour of outer skin of onion is due to presence of Anthocyanin and Quercetin, respectively. Anti-fungal activities in onion is due to a phenolic factor i.e., Catechol. Major onion producing countries include China, India, USA, Pakistan, Turkey, Russia, Iran, Brazil, Mexico and Spain. Area and Production China is the biggest onion producer with 26.30% of all onions being produced in China and India. India ranks first in area (1.17 million hectares) and second in production (20.33 million tonnes) with a productivity of 21.2 t/ha. (Source: NHB, 2015) .In India it occupies of leading area and production of Maharashtra and productivity in Gujarat. The highest productivity is in USA with 56.0 tons/ha followed by Spain 53.0 tons/ ha and in China it is 22.0 tons/ha. The major onion growing states includes Maharashtra, Karnataka, Madhya Pradesh, Andhra Pradesh, Gujarat, Rajasthan, Bihar, Haryana, Uttar Pradesh, Tamil

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Nadu and Odisha. High yielding varieties and hybrids are the major factor in improving the current productivity level. Many several factors like biotic and physiological factors which affect the yield of onion adversely and reduce productivity.The low yield of onion in the country is reported to be due to low fertility of soil, inappropriate fertilizer rate, lack of improved varieties, and poor management practices (Lemma and Shimelis, 2003).Nitrogen and phosphorus are often referred to as the primary macro nutrients because of the probability of plants being deficient in these nutrients and because of large quantities taken up from the soil relative to other essential nutrients(Marschner, 1995).

Vegetables are the rich source of vitamins, minerals and dietary fibers and so play a vital role in providing nutritional security. Among vegetable crops, onion is the major commercial crop contributing major share in India's vegetable export. India ranks second both in area and production of onion in world next to China and is the third exporter after Netherlands and Spain. During 2015-16, total area under onion cultivation in India was 13.20 lakh hectares with a total production of 209.31 lakh tons and productivity 15.86 t/ha (NHRDF, 2017).Onion (*Allium cepa* L.) belonging to the family Alliaceae is one of the oldest vegetables in the world and has been cultivated for more than 5000 years. It is native to Central Asia and the secondary center of origin is in the near East (McCollum, 1976). Adaptation of onion in India occurred from very ancient times before Christian era. Originally being a native of temperate region of Central Asia with perennial/biennial habit and long day bulbing nature, it has established well in India under tropical and short day (11-11.5h) photoperiodic conditions (Seshadri and Chatterjee, 1996).Successful onion production in

any area depends on the selection of varieties that are adapted to particular conditions imposed by specific environment and best planting time..Therefore varietal evaluation has been take in Research station to study the performance of three improved varieties.

Materials and Methods

The experiment was conducted at RRTTS, G.Udayagiri, during *Kharif* season of 2020-21. Experimental material consisted of five varieties of onion (*Allium cepa* L.) such as Agrifound Dark Red, Agrifound Light Red, Agrifound White. The experiment was laid out in RBD design with five replications. The details of the experiment are given below.

a) Varieties :3 ; Agrifound Dark Red , Agrifound Light Red and Agrifound White

b) Design: RBD

c) Replications: 5

d) Spacing: 20 cm x 10 cm

e) Fertilizer dose : 120:60:100

Seedlings were raised on nursery beds. Nursery beds of 1m width and convenient length were taken inside a rain shelter to protect the seedlings from monsoon rains. Well rotten compost was incorporated in the nursery beds. Forty-five days old seedlings were used for transplanting in the main field . Observation was taken on yield and yield attributing parameters.

Experimental findings

Plant height The analysis of variance showed that plant height was significantly ($P < 0.05$) affected by Variety. The plant heights of Agri Found Dark Red, Agri found Light Red and Agri found white varieties attained maximum height of (45.36,40.50 and 34.63 cm) respectively(Table-1). Although they have grown in the same environment the difference in plant height among the onion varieties could be due to the difference in their genetics make up that was differently influenced by the environment. Tegbew (2011) indicated the mean plant height of Adama Red (62.25 cm) cultivar was significantly higher than Bombay Red (56.04 cm) cultivar. The result was similar to the finding of Ghafoor *et al.* (2003) and Yemane *et al.* (2014) who indicated the presence of significant differences among onion cultivars in plant heightLeaf number varied significantly among different dates of planting.

Maximum number of leaves (13.33) was recorded in Agrifound Dark Red followed by 8.00 numbers in Agrifound light Red variety (Table 1).. This is in accordance with the findings of Misra*et al*., (2014) who reported the highest number of leaves in 25th November and 10th December planted crops. Das (2008) also reported variation in number of leaves of onion varieties among different planting dates. Effect of varieties on number of leaves was also found significant. Agrifound Dark Red recorded the highest number of leaves. Chandrika and Reddy (2011) also noted a significant varietal effect on number of leaves in onion plant.

The highest bulb weight was recorded in Agri found Dark Red (253.33 g) which was followed by 175.00g in Agri found Light Red (Table 1).). Mahadeen (2009), Nandal and Singh (2002), Mohanta and Mondal (2014) also reported a significant variation in average bulb weight with respect to planting dates. However a significant variation in bulb weight was noted among varieties by Tripathy and Lawande (2008).

Yield per plot varied significantly among different varieties also.The onion varietyAgrifound Dark Red was observed to be the highest yielder with yield of 350qha^{-1} in *kharif* season in Kandhamal district of Odisha.Yield was lowest in Agrifound White (126.50qha^{-1}) (Table 1). Agrifound Dark Red was identified as a promising variety with a bulb yield 5.83 kg/m2 by Haldar et al., (2009). Khar*et al*., (2000) and Yadav *et al*., (2009) also reported variation in bulb yield among different varieties under same cultural practices. Menon *et al.*, (2016) reported a highest total bulb yield in the variety Agrifound Light Red which was followed by Arka Kalyan, Agrifound White, Arka Pragati and Agrifound Dark Red.

Table1.Performance of onion varieties

Onion varieties	Height of plant(cm)	No of leaves	Average weight of bulb(g)	Average yield/plot($4m^2$) kg	Yield (q/ha)
Agrifound Dark Red	45.36	13.33	253.33	14.16	350.00
Agrifound Light Red	40.50	12.00	175.00	8.00	201.66
Agrifound Dark white	34.63	7.33	87.00	5.06	126,50
C.D					44.59

Conclusion

Onion is widely recognized as an important vegetable condiment as a form of dry bulb and cash crop. It is successfully produced under rained as well as irrigated conditions in different agro- ecologies of the country by small holder farmers and commercial growers. However, the productivity of onion is not as expected due to many production constraints. The use of lower yielder and un adaptable varieties is among the many production constraints. So, selection of varieties that produce high yield is very critical to improve the yield of onion.Therefore; this study was conducted to evaluate the performance of three onion varieties during kharif season at RRTTS, G.Udayagiri. The experiment was laid out in randomized complete block design (RBD) with five replications. Data were collected for phenology of the crop, growth, yield and yield components and analyzed accordingly. The analysis of variance revealed the significant effect of variety on all the parameters .Agrifound Dark red variety had superior plant height, Leaf number, and marketable bulb yield than the other tested varieties.

Future Research:

Experiments will be conducted in farmers field.

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