



# Suitability of *Kharif* Onion Varieties in Mahasamund district of Chhattisgarh

Saket Dubey, Satish Verma, Kunal Chandrakar and Ravish Keshari

Indira Gandhi Krishi Vishwavidyalaya, Raipur- 492 006 (Chhattisgarh)

## ABSTRACT

The study regarding suitability of various *Kharif* onion varieties was carried out in Krishi Vigyan Kendra, Mahasamund farm during *Kharif* 2016-17. The experiment consisted of three varieties namely Bhima Super, Bhima Shweta and Agrifound Dark Red was laid out in randomized block design with three replications. The nursery beds 1m wide and 3m long were prepared and elevated up to 20 cm from ground levels. The study revealed that plant height (57.81 cm), number of leaves per plant (12.82), leaf length (50.04 cm), neck thickness of the bulb (0.47 cm), total duration of the crop (211.43d), bulb weight (99.95 g) and bulb yield (272.42 q/ha) were found to be highest in variety Agrifound Dark Red while bolting percentage (0.40 %), bulb to green top ratio (1:0.17), double bulb (0.39 %) were found to be minimum in onion variety Agrifound Dark Red.

**Key Words:** Crop, Duration, *Kharif*, Onion, Suitability, Varieties, Yield.

## INTRODUCTION

Onion (*Allium cepa* L.) is one of the most important bulbous crops of the Chhattisgarh, belongs to family Amaryllidaceae. India is the second largest producer of onion in the world and Maharashtra is leading onion producing state in India and contributing 32 percent of total onion production of the country. In Chhattisgarh, it is grown on 25,091 ha area with a production of 4,15,465 MT (Anon, 2017). Onion is used as a vegetable as well as in the form of a spices and condiment. Its green leaves, immature and mature bulbs are eaten raw or used in vegetable preparations. Its bulb has characteristic odour, flavor and pungency which is due to sulphur bearing compound in very small quantity (about 0.005%) in the volatile oil, allyl propyl disulphide ( $C_6H_{12}O_2$ ). The colour of the outer skin of onion bulbs is due to quercetin. *Kharif* onion production has several advantages *i.e.* increases total production to meet out the demand of fresh onion in the market and have higher price as compared to main season onion. There are different varieties which are grown by the farmers in the rabi season but as far as *Kharif* onion production is concern, lot of work has to be done so that the farmers will not suffer from low

production and to avoid such problem first of all the important part is to select the varieties suitable for growing in *kharif* season. Thus, an experiment was conducted in order to test the suitability of various *Kharif* onion varieties in Mahasamund district of Chhattisgarh.

## MATERIALS AND METHODS

The study was carried out in Krishi Vigyan Kendra, Mahasamund farm during *Kharif* season 2016-17. The experiment consisted of three varieties namely Bhima Super, Bhima Shweta and Agrifound Dark Red was laid out in randomized block design with three replications. The nursery beds 1m wide and 3m long were prepared and elevated up to 20 cm from ground levels. Treated seeds with Bavistin @ 1g/kg of seeds of different varieties of onion were sown on the nursery beds in rows 5 cm apart. After sowing seeds were covered with a thin layer of sieved FYM and paddy straw. Seedlings treated with Bavistin were transplanted in the plots at a spacing of 15 cm (row to row) and 10 cm (bulb to bulb). Transplanting was done in the afternoon hours immediately followed by irrigation for proper establishment of the seedlings. Gap

filling was carried out after a week of transplanting and light irrigation applied just after gap filling of seedlings. The experimental field was kept weed free throughout the crop growth period. Timely manuring and fertilization were carried out by applying recommended doses of nitrogen (120kg/ha), phosphorus (60kg/ha), potassium (60kg/ha) and sulphur (25kg/ha) were applied in each plot. The first light irrigation was given just after sowing and thereafter as and when needed depending upon moisture availability in the soil and was withheld before 20d of harvest. The crop was harvested when 75 per cent tops start falling over but before the foliage is completely dry. The bulbs were harvested by hand pulling and hand hoe. The observation on plant height, number of leaves per plant and leaf length was calculated at 30d after transplanting (DAT), 60 DAT, 90 DAT and at 120 DAT. Bolting percentage was calculated before harvesting. At the time of harvesting, the parameters recorded were neck thickness of the bulb, bulb to top green ratio, bulb weight and bulb yield. Total duration of the crop was worked out by calculating the days taken from seed sowing in nursery to maturity, when leaf completely dry while crop duration was days taken from transplanting to maturity, when leaf completely dried. The height of selected plants was measured with the help of meter scale.

## RESULTS AND DISCUSSION

### Plant height

At 30 days after transplanting, the highest plant height (36.10 cm) was recorded in variety Agrifound Dark Red whereas the lowest plant height was observed in variety Bhima Super (31.80 cm). The same pattern was followed upto 120 DAT in which the highest plant height 57.81cm were recorded in variety Agrifound Dark Red whereas the lowest plant height of 53.25 cm was observed in variety Bhima Super. This may be due to genetical makeup of the varieties and application of major and minor nutrients, increased the photosynthetic activity, chlorophyll formation, nitrogen metabolism and auxin contents in the plants which ultimately

improving the plant height. Similar results have been reported by Bindu and Bindu (2015).

### Number of leaves per plant

The Number of leaves per plant was found to be maximum (5.68 leaves/plant) in variety Agrifound Dark Red whereas the value was found to be minimum in variety Bhima Super (3.98) at 30 DAT. The same pattern was followed upto 120 DAT in which the number of leaves per plant was found to be maximum (12.82 leaves/plant) in variety Agrifound Dark Red whereas the value was found to be minimum in variety Bhima Super (9.49). The probable reasons for enhanced more number of leaves, may be due to primitive effects of macro and micronutrients on vegetative growth which ultimately lead to more photosynthetic activities and enhancing the rate of cell division and cell enlargement of plants. These findings were in agreement with the findings of Sarada *et al* (2009), Dewangan *et al* (2012) and Dwivedi *et al* (2012).

### Leaf Length

The length of selected leaf was measured from the origin portion of the leaf to the tip of the leaf. The length of leaf from 30 DAT to 120 DAT was found to be maximum in variety Agrifound Dark Red (34.79 cm in 30 DAT to 50.04 cm in 120 DAT) while minimum in variety Bhima Super (31.87 cm in 30 DAT to 47.49 cm in 120 DAT). The probable reasons for enhanced more number of leaves, may be due to primitive effects of macro and micronutrients on vegetative growth which ultimately lead to more photosynthetic activities and enhancing the rate of cell division and cell enlargement of plants. These findings were in agreement with the findings of Dewangan *et al* (2012) and Dwivedi *et al* (2012)

### Neck thickness of the bulb (cm)

The selected plant was tagged and neck thickness of bulb from each plot and replication was recorded manually and the mean neck thickness was calculated at harvest. The neck thickness was affected greatly by different varieties. The minimum 0.47 cm neck thickness was recorded in

## Suitability of *Kharif* Onion Varieties

**Table 1. Observation on variation in plants characteristics at different time Intervals.**

Varieties	Plant Height (cm)				Number of leaves per plant				Leaf Length (cm)			
	30	60	90	120	30	60	90	120	30	60	90	120
Bhima Super	31.80	49.10	56.22	53.25	3.98	5.91	7.02	9.49	31.87	42.86	49.20	47.49
Bhima Shweta	32.50	51.39	58.04	56.77	4.16	6.14	8.52	10.61	32.38	44.52	49.70	48.82
Agrifound Dark Red	36.10	54.30	59.69	57.81	5.68	7.42	10.52	12.82	34.79	49.87	52.76	50.04

\*Different time Intervals: 30 days after transplanting (DAT), 60 DAT, 90 DAT & 120 DAT.

variety Agrifound Dark Red whereas the maximum of 0.88 cm was found in variety Bhima Shweta. Variation in neck thickness was due to the inherent genetic makeup of the varieties, which is some way influenced by quantity of irrigation water such as more irrigation at the growth period leads to increased neck thickness of the bulb but minimum neck thickness is desirable character of variety. It also helps to increase the shelf life of the bulb. The findings were also in agreement with the findings of Dewangan *et al* (2012), Hirave *et al* (2015).

### Bolting percentage

The bolting percentage was calculated by counting selected tagged plants as well as total plants in plot per replication before harvesting. The lowest bolting percentage of 0.40 per cent was observed in variety Agrifound Dark Red whereas the maximum percentage of 3.12 per cent bolts was observed in variety Bhima Super. This may be due to the inherent genetic makeup of the varieties. and also depends on the cultural practices adopted during bulb initiation and development period. These results are in agreement with the results of Supe *et al* (2008) who found that to control bolting while maintaining yield requires high levels of soil N availability during growth periods of onion.

### Total crop duration

By calculating total duration of the crop it was found that variety Bhima super was the earliest among varieties under study and it took total crop duration of 205.46 d while the variety Agrifound Dark Red has taken a longest of 211.43 d.

The Probable cause for variation in the total duration of the crop was due to the inherent genetic makeup of the varieties, nitrogen in plants increased cell division and cell differentiation. Thus, plant remained in vegetative phase and resulted in imbalance between C: N ration thus delayed maturity at higher nutrient level also depends on environmental factors. The findings were in agreement with the finding of Rajpurohit (2016).

### Bulb to green top ratio

The weight of bulb and green top 20d before harvesting and ratio between both were calculated and the minimum bulb and green top ratio was recorded in variety Agrifound Dark Red (1:0.17) while the maximum bulb and green top ratio were recorded in the Bhima super (1:0.27). Probable reason, when the growth phase completed than food material deposition in bulb and start the cell enlargement in bulb and stored moisture and nutrients.

### Double bulb

Number of doubles bulb per plot was counted after the harvesting in each treatment and converted in to percentage. The significantly lowest 0.39 percentage of double bulb was recorded in the variety Agrifound Dark Red followed while the variety Bhima Super has maximum number of double bolts of 0.78 per cent. This may be due to inherent genetical makeup of the variety.

### Crop Duration

The maximum crop duration of 157d for

**Table 2. Evaluation of different parameters.**

Variety	Neck Thickness (cm)	Bolting (%)	Total Crop Duration (Days)	Double Bulb (%)	Crop Duration (Days)	Av. fresh weight per bulb (g)	Bulb yield Per plot (kg)	Bulb yield/ha (q)
Bhima Super	0.88	3.12	205.46	0.78	151.64	84.13	17.44	189.11
Bhima Shweta	0.73	1.40	209.54	0.45	154.98	87.49	22.33	232.37
Agrifound Dark Red	0.47	0.40	211.43	0.39	157.82	99.95	25.48	272.42

maturity was observed in variety Agrifound Dark Red while minimum of 151.64d was observed in variety Bhima Super. The maturity depends on the varietal and genetic character of onion and also governed by environmental factors.

#### **Bulb weight and Bulb yield**

Average fresh weight of bulb, bulb yield per plot and per hectare as affected by different varieties is worked out at the time of harvesting and results shows that the variety Agrifound Dark Red was pioneer in bulb weight as well as in bulb yield while the variety Bhima Super was found to be lowest in fresh weight as well as in bulb yield. The weight per bulb (g), bulb yield (kg) and bulb yield per hectare (q) was found to be maximum in variety Agrifound Dark Red while all these parameters were found to be minimum in variety Bhima Super.

The Probable region for increased fresh weight of bulb per plant due to humus substances could have mobilized the reserve food materials to the sink through increased activity of hydrolyzing and oxidizing enzymes. Similar results have been reported by Bindu and Bindu (2015) and also by Singh and Bhonde (2011) while the probable reason for enhanced bulb yield may be due to inherent genetic makeup of the varieties and effects of nutrients (macro and micro) on vegetative growth which ultimately lead to more photosynthetic activities enhance carbohydrate and nitrogen

metabolism of peptic substances, as well as improve the water metabolism and water relation in the plants and also plant height, number of leaves, leaf area and management practices are also responsible for increasing the bulb weight.

#### **CONCLUSION**

The results of different varieties tested for cultivation in *Kharif* season revealed that the variety Agrifound Dark Red can be adopted for cultivation during *Kharif* season in Mahasamund district of Chhattisgarh.

#### **REFERENCES**

- Anonymous (2017). Directorate of Horticulture and Farm Forestry, Naya Raipur (C.G.)
- Bindu B and Bindu Podikunju (2015). Performance evaluation of Onion (*Allium Cepa* L.) varieties for their suitability in Kollam district. *Int J Res Studies Agril Sci* 1(1): 18-20.
- Dewangan S R, Sahu G D and Kumar A (2012). Evaluation of different *Kharif* Onion (*Allium cepa* L.) genotypes in Chhattisgarh plains. *Indian Hort J* 2 (1 & 2): 43-45.
- Dwivedi Y C, Kushwah S S, Sengupta SK (2012). Evaluation of onion varieties for growth, yield and quality traits under agro-climatic conditions of Kymore Plateau region of Madhya Pradesh, India. *Agril Sci Digest* 32(4): 326-328.
- Hirave PS, Wagh AP, Alekar AN and Kharde RP (2015). Performance of red onion varieties in *kharif* season under Akola conditions. *The Ecoscan( Special issue)* 8: 381-384.

## Suitability of *Kharif* Onion Varieties

- Mahmud Mishu, Hasan Ahmed, Fahim Rafii, M, Faruq Golam and Latif A (2013). Effect of sulphur on growth, yield and yield attributes in onion (*Allium cepa* L.). *Australian J Crop Sci* 7:1416-1422.
- Sarada C, Giridhar Kalidasu Rao NH (2009). Varietal performance of onion (*Allium cepa* L.) in black soils. *Annals Plant Physio* 23 (2):266-267
- Singh RK, Bhonde SR and Gupta RP (2011). Genetic variability in late *kharif* onion (*Allium cepa* L.). *J Appl Hort* 13:74-78.
- Supre VS, Marbhal SK, Patil SD (2008). Performance of onion genotype in late *kharif* season under Nasik conditions. *Int J Agric Sci* 4(1):81-82.

Received on 11/03/2019      Accepted on 05/04/2019