

**RESEARCH ARTICLE :**

Evaluation of different varieties of onion in Nimar region of Madhya Pradesh

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27.11.2018;

Revised :

02.01.2019;

Accepted :

08.01.2019

SUMMARY : Onion varieties were evaluated for adaptability to the climatic conditions in India. It is used both raw and mature bulb stage as vegetable and spice. Three varieties of onion were planted under a Complete Randomized Block Design at farmer field. Successful onion production depends on the selection of varieties that are adapted to different climatic conditions imposed by specific environment. The quantitative data on yield of onion varieties and farmers perception on the varieties were collected. All the varieties were harvested at their maturity (80% top down) and then graded and weighted. The results revealed that highest plant height (cm) was reported from onion variety Agrifound light red (60.51cm) and lowest by NHRDF Red-3(57.88cm) . Similarly onion variety registered maximum number of leaves NHRDF Red-3 (10.28) and the lowest by Agrifound light red (9.99). Maximum weight of bulb (82.91g) and total yield of bulb (356.0) quintal/hectare was exhibited by var. Bhima Shakti with minimum days taken maturity (126.60) and minimum per cent incidence of bolting (1.66 %). The cultivar Bhima Shakti and NHRDF Red-3 performed well for the Nimar region of Madhya Pradesh in *Rabi* season.

KEY WORDS:

Onion varieties, On farm evaluation, Growth, Yield attributes

How to cite this article : Vibhute, Megha and Singh, Ajeet (2019). Evaluation of different varieties of onion in Nimar region of Madhya Pradesh. *Agric. Update*, 14(1): 33-36; DOI : 10.15740/HAS/AU/14.1/33-36. Copyright@ 2019: Hind Agri-Horticultural Society.

BACKGROUND AND OBJECTIVES

Onion is one of the most important spices and vegetable crops grown in india. Onion stands first among the spice crops in the country, both in area and production. Onion is being grown in an area of 12.03 lakh hectare (Anonymous, 2014) which gives total production of 197.01 lakh MT after China. Globally, India ranks second in area and fifth in production. In Madhya Pradesh, onion occupied an area of about 117.88 m.ha. with production of 2842.00 mt. Onion is valued for its distinct pungency or mild flavour and form

of essential ingredient of many dishes.It is consumed universally in small quantities and used in many home almost daily, primarily as a seasoning for flavouring of dishes, sauces, soup and sandwiches in many countries of the world. Onion also contains vitamin B, vitamin C, carbohydrate and small per cent of proteins (Leema *et al.*,1994). The onion develop distinct bulbs depending on the varieties. These bulbs varying in size (small, medium and large) colour (white, yellow and red) and shape (flattened, round and globular). The onion are grouped into short-days and long

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days depending on the day length requirements. Onion also requires varying day length and temperature for the purpose they produced. A relatively high temperature and long photoperiod are required for bulb formation and for seed production.

Temperature is of immense importance than day length. Since the population is expected to about double with in next few year, therefore, productivity per unit area will have to be increased substantially to meet expected food requirements. This low production of onion is due to non-suitable varieties under different agro climatic conditions. The objective of the on-farm trials was to evaluate the yield performance and productivity of promising varieties of onion on farmers field in Burhanpur and also to obtain farmers perceptions on the varieties evaluated.

Rabi onion is an off season cultivation of the crop for which standardization of varieties is of immense utility. Since little information is available about *Rabi* season onions, it was felt imperative to find out suitable varieties for its successful cultivation. Nandkarni (1954) reported many medicinal properties of onion *viz.*, diuretic, applied on bruises, boil and wounds. It also relieves heat sensation.

RESOURCES AND METHODS

An on farm trial was conducted in Burhanpur district of Madhya Pradesh during the *Rabi* (winter) season of 2014-15, 2015-16 and 2016-17. The soil of the experimental plot was black cotton in texture, having pH around 7.8. The seeds are sown in nursery during the October. The seeds are slightly covered with soil and irrigated with the help of sprinkler. Nursery was kept

weed free manually. Seed germination was given at the time of sowing and other irrigation was given after an interval of 15 days or according to the need of the crop. Eight weeks old healthy seedlings of each varieties were transplanted on flat beds at a spacing of 15x10cm in a plot of 2.40x 1.30 m. The crop received uniform dose of vermicompost 10 t/ha and fertilizer 100 kg/N, 50 kg/P₂O₅ and 50kg/K₂O per hectare. Fertilizer was applied in the form of urea (46% N) single super phosphate (16%P) and muriate of potash (60% K). Vermicompost applied during land preparation and full dose phosphorus and potash and half of total nitrogen were applied at the time of planting. Remaining nitrogen was top dressed in equal two split dose. All the cultural and management practices like hoeing, weeding, irrigation and sprays for insects pests and disease control etc were carried out uniformly. Matured bulbs were kept on the open floor to cure for three days. After curing and chopping of tops bulbs were weighed. Five plants were selected at random in each plot to record the observations on height of plants (cm), leaves per plants (cm), days required for maturity, bolting percentage per cent, neck thickness (cm), weight of bulb (g) and total yield (q/ha).

OBSERVATIONS AND ANALYSIS

The results obtained from the present investigation on the evaluation of different varieties of onion in Nimar region during 2014-15, 2016-17 and 2017-18 are discussed given Table 1.

Plant height:

The plant height was finally recorded at 90 DAT

Table 1 : Response of different onion varieties for different growth parameters studied

Varieties	Plant height (cm)				No. of leaves				Days require for maturity			
	2014-15	2015-16	2016-17	Mean	2014-15	2015-16	2016-17	Mean	2014-15	2015-16	2016-17	Mean
Bhima shakti	59.72	59.86	60.30	59.96	9.81	10.13	10.08	10.03	126.30	127.19	126.33	126.60
NHRDF Red-3	57.65	58.01	57.98	57.88	10.93	9.80	10.11	10.28	129.30	128.90	129.86	129.35
Agrifound light red	60.97	59.81	60.76	60.51	10.11	10.06	9.80	9.99	127.68	126.70	127.96	127.44

Table 2 : Response of different onion varieties for different yield and yield contributing parameters

Varieties	Neck thickness (cm)				Bolting %				Bulb weight (g)				Yield q/ha			
	2014-15	2015-16	2016-17	Mean	2014-15	2015-16	2016-17	Mean	2014-15	2015-16	2016-17	Mean	2014-15	2015-16	2016-17	Mean
Bhima shakti	2.20	2.33	2.23	2.25	1.66	1.70	1.63	1.66	82.90	83.06	82.79	82.91	360.8	351.9	355.3	356.0
NHRDF Red-3	2.79	2.69	2.77	2.74	1.94	1.88	1.90	1.90	76.90	75.90	76.83	76.57	300.6	295.4	325.6	307.2
Agrifound light red	2.70	2.98	2.88	2.85	2.01	2.09	2.15	2.08	73.55	74.66	73.09	73.74	250.1	266.6	260.9	259.2

(days after transplanting), showed maximum plant height (60.51cm) in the variety Agrifound light red which was at par with Bhima Shakti (59.96 cm) and NHRDF Red - 3 (57.88 cm). This type of differences in the plant height of plant growth might be due to their genetically behaviour and also suitability of climate and soil for specific variety. This findings are in accordance of Mohanty and Prusti (2001); Diwivedi *et al.* (2012) and Kushal *et al.* (2015) in onion.

Number of leaves:

The mean values for varieties (Table 1) depicted that onion varieties are different with respect to number of leaves per plants. NHRDF Red-3 exhibited number of leaves (10.28), which was at par with Bhima Shakti (10.03) and Agrifound light red (9.99). Similar results were reported by Sarada *et al.* (2009) and Dewangan *et al.* (2012) under different climatic conditions with different varieties.

Days required for maturity:

Bhima Shakti (126.60) required minimum days for maturity followed by Agrifound light red (127.44) and NHRDF Red -3 (129.35). This type of differences among different varieties and adoptability under different climatic conditions also reported by Sharma (2009); Singh and Bhonde (2011) and Tripathy *et al.* (2013) in onion.

Bolting per cent:

The variety Bhima shakti recorded minimum (1.66%) bolting of bulb which was found to be at par with variety NHRDF Red-3 (1.90%) and Agrifound light red (2.08%). It may be due high temperature prevalence throughout the crop period and varietal character. These results are in conformity with the finding of Warade *et al.* (1996); Tarai *et al.* (2015) and Kumar and Prasad (2015).

Neck thickness:

The variety Bhima shakti was observed minimum (2.25cm) neck thickness followed by NHRDF Red-3 (2.74cm). Maximum neck thickness (2.85cm) was recorded in the variety of Agrifound light red. 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 finding of Kushal *et al.* (2015) and Dewangan *et al.* (2012).

Bulb weight:

The maximum weight of bulb (82.91g) were recorded with variety Bhima shakti, while the variety NHRDF Red-3 at par for bulb weight (76.57g) whereas, variety Agrifound light red recorded minimum weight of bulb (73.74g). Similar results were reported by Yadwinder and Prar (2002); Sharma (2009) and Sarada *et al.* (2009) they observation similar trend in different varieties at different locations.

Yield :

The maximum yield of bulb per hectare (356.0 q/ha) was obtained with Bhima shakti followed by NHRDF Red -3 (307.2q/ha) and minimum yield per hectare (259.2 q/ha) were found under Agrifound light red. This type of varietal difference in onion was also reported by Sharma (2009); Singh and Bhonde (2011); Tripathy *et al.* (2014); Kumar and Prasad (2015) and Sarkar *et al.* (2015) in onion.

Conclusion:

The experimental evidence warrant the following specific conclusion which may be adopted for profitable cultivation of onion. On the basis of results of the present investigation it may be concluded that Bhima Shakti and NHRDF Red-3 varieties of onion are high yielding for cultivation under Nimar region during *Rabi* season.

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