



Evaluation of Onion (*Allium Cepa L.*) Varieties for its Suitability in Bundelkhand Region

Dikshit, Archana, Pandey N K, Tiwari, Dinesh and Chauhan A K

Krishi Vigyan Kendra, Lalitpur

ABSTRACT

In order to identify suitable *Rabi* onion varieties for Lalitpur district, an experiment was laid out during 2018-19. Two high yielding onion varieties were tested with four replications in comparison to that of local variety being grown by the farmers of the area. Different treatments included onion variety Agrifound Light Red (T1), NHRDF Red 3 (T2) and local variety Lalima (T3). The results revealed that highest plant height (59.29 cm) was reported from in Agrifound Light Red and the lowest in local variety (35.2 cm). Similarly, onion variety NHRDF Red-3 recorded maximum number of leaves (10.2), maximum neck thickness (1.62 cm) along with maximum weight of bulb (71.8 g) and marketable yield per hectare (259.5 q). Highest B:C Ratio (2.84) was reported from cultivation of onion variety NHRDF Red-3. It was concluded from the study that onion variety NHRDF Red-3 had better performance in the trial and can be recommended for cultivation in Bundelkhand region.

Key Words: Bulb yield, Marketability, Onion, Variety.

INTRODUCTION

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 Lalitpur district, it is grown on 2,458 ha area with a production of 66,366 MT (Anon, 2018). It is used both in raw and mature bulb stage as vegetable and spice. The pungency in onion is due to the presence of volatile oil known as allyl propyl disulphide (Mohanty and Prusti, 2001). Dehydrated powder, flakes and paste prepared out of onion provide rich agro-industrial base for these commodities. Onion can be grown under a wide range of climatic condition (Singh *et al*, 1991) but succeeds best in mild season without extremes of heat and cold. Successful onion production depends on the selection of varieties that are adapted to different climatic conditions. Mahala *et al* (2019) revealed that transplanting of onion in 15x10cm geometry recorded maximum plant height (30.87cm) which was statistically at par with

10x10cm crop geometry (28.93) but significantly different from 10x7.5cm (24.87cm). However, no systematic study has been conducted to assess the suitability of onion cultivation in Lalitpur district of Bundelkhand, for which standardization of varieties is of immense utility. Hence, the present experiment was conducted to study the response of some improved varieties of onion (*Allium cepa L. var. cepa*) for their suitability for cultivation in Lalitpur district of Bundelkhand.

MATERIALS AND METHODS

The study was carried out by the Krishi Vigyan Kendra, Lalitpur farm during *Rabi* season 2018-19. The experiment consisted of three varieties namely Agrifound Light Red, NHRDF Red 3 and Local Variety (Lalima) was laid out in randomized block design with four 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

Table 1. Observation of growth attributing characters of Onion.

Variety	Plant height (cm)			Number of leaves per plant			Leaf length (cm)		
	30 DAT	60 DAT	90 DAT	30 DAT	60 DAT	90 DAT	30 DAT	60 DAT	90 DAT
Agrifound Light Red	36.20	54.10	59.29	3.59	6.4	8.2	35.41	52.25	57.69
NHRDF Red 3	32.85	52.45	54.93	4.68	7.3	10.2	30.56	49.58	53.45
Local (Lalima)	25.50	32.69	35.20	3.1	4.8	5.4	24.69	30.78	34.87

of onion were sown on the nursery beds in rows 5 cm apart. After sowing seeds were covered with a thin layer of sieved farm yard manure. Seedlings treated with Bavistin were transplanted in the plots at a spacing of 15 X 10 cm. 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 20 days 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.

Ten plants were randomly selected in each entry to record observations on growth, yield, quality parameters, pest and disease incidence. Economics of onion was worked out based on the current market price of inputs and outputs. The observation on plant height, number of leaves per plant and leaf length was calculated at 30 days after transplanting (DAT), 60 DAT and at 90 DAT. At the time of harvesting, the parameters recorded were neck thickness of the bulb, 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. The height of selected plants was measured with the help of meter scale.

RESULTS AND DISCUSSION

Perusal of data indicates that, onion varieties had profound effect on growth and quality parameters (Table 1 and 2), highest bulb yield was observed in NHRDF Red 3 variety (259.50 q/ha) which is significantly higher than bulb yield of local variety (172.5 q/ha.). Such superior yield of NHRDF Red 3 was mainly due to higher growth and yield parameters like number of leaves per plant (10.2), neck thickness (1.62 cm), bulb diameter (polar-5.1 cm and equatorial-4.7 cm) and per cent bulb yield (A grade - 49.57%, B grade - 32.46 % and C grade - 27.58 %) (Table 1,2,3). Although the superiority of Agrifound Light Red variety was observed in plant height (54.10 cm), leaf length (57.69 cm) and days to maturity (160 days). The variation in the bulb yields of different varieties of onion have also been reported from several places. The superiority and higher yields of NHRDF Red 3 onion variety has also been reported by Kerure *et al* (2016) in Karnataka and Tripathy *et al* (2013).

The economics of onion production under on farm testing were estimated and the results have been presented in Table 4. The economic analysis of the data revealed that NHRDF Red 3 variety recorded higher gross returns (Rs. 1,81,650/ha), net returns (Rs. 1,34,350/ha) and B:C ratio of 2.84 compared to Agrifound Light Red. A similar better economic return by cultivation of NHRDF Red 3 variety compared to other varieties was reported by Kerure *et al* (2016).

Evaluation of Onion (*Allium Cepa L.*) Varieties for its Suitability in Bundelkhand Region

Table 2. Observation of yield and yield-attributing characters of Onion.

Variety	Neck Thickness (cm)	Crop Duration (Days)	Equatorial diameter (cm)	Polar Diameter (cm)	Average weight of bulb(g)	Bulb yield (q/ha)
Agrifound Light Red	0.88	160	4.8	4.3	68.5	229.6
NHRDF Red 3	1.62	175	4.7	5.1	71.8	259.5
Local (Lalima)	0.45	180	2.8	3.4	55.3	172.5

Table 3. Grading percentage of Bulb yield.

Grade %	A Grade (> 6.5 cm)	B Grade (5.5-6.5 cm)	C Grade (4.5-5.5 cm)
Agrifound Light Red	42.56	33.56	29.57
NHRDF Red 3	49.57	32.46	27.58
Local (Lalima)	32.74	29.78	38.67

Table 4. Yield and economics of different varieties of onion.

Variety	Total Yield (q/ha)	Gross Return (Rs.)	Cost of Cultivation (Rs.)	Net return (Rs.)	B:C Ratio
Agrifound Light Red	229.6	1,60,720	46,400	1,14,320	2.46
NHRDF Red 3	259.5	1,81,650	47,300	1,34,350	2.84
Local (Lalima)	172.5	1,03,500	39,000	64,500	1.65

Table 5. Varietal performance and farmers perception on various characters of onion.

Sr. No.	Size	Shape	Colour	Skin	Yield	Market Preference	Seed Availability	Total	Ranking
Agrifound Light Red	2	1	3	2	2	3	3	16	II
NHRDF Red 3	1	1	1	2	1	1	4	11	I
Local (Lalima)	5	5	4	4	4	5	1	28	III

Preference scale: 1-6 (1- highest preference, 6 lowest preference)

The ranking of onion varieties based on the perception of the farmers are presented in Table 5, which indicates NHRDF Red 3 variety as the most preferred onion variety compared to Agrifound Light Red and Local varieties. The farmers perceived and ranked NHRDF Red 3 variety number one as this variety produced good size of bulbs, attractive shape, colour, better yield and market preference. Agrifound Light Red was ranked number two among the varieties studied. While Lalima recorded the lowest preference because farmers did not appreciate its size, shape, colour, skin, lower yield, and market preference along with its nature

of susceptibility to purple blotch and proneness to damping off disease. However based on seed availability for current season crop production, the local variety Lalima ranked number one, compared to other two varieties as these varieties still needs to be introduced into seed chain in the district Lalitpur. Similar evaluation of onion varieties for productivity performance was reported in Botswana (Southern Africa) (Baliyan, 2014).

CONCLUSION

The results of different varieties tested for cultivation in *Rabi* season revealed that the variety

NHRDF Red 3 can be adopted for cultivation during *Rabi* season in Lalitpur district of Bundelkhand because of its higher yield, varietal performance and market preference.

REFERENCES

- Anonymous (2018). *Database of Horticultural Crops*. District Horticulture Department, Lalitpur (U.P.)
- Baliyan Som Pal (2014). Evaluation of onion varieties for productivity performance in Botswana. *World J Agri Res* 2 (3) : 129-135.
- Kerure P, Chandrappa D, Salimath S, Rudragouda F, Chandragouda S, Onkarappa and Gajendra T H (2016). Varietal assessment in onion for higher productivity and quality. In: *1st KVK Symposium zone VIII*, held at UAS, Dharwad from 21-22, January pp 85.
- Mahala P, Jaidka M, Sharma M and Brar N S (2019). Effect of crop geometry on growth and yield of *kharif* onion. *J Krishi Vigyan* 7 (2) : 267-269
- Mohanty B K and Prusti A M (2001). Performance of common onion varieties in *kharif* seasons *J Trop Agri* 39: 21-23
- Tripathy P, Priyadarshini A, Das S K, Sahoo B B and Dash D K (2013). Evaluation of onion (*Allium cepa* L.) genotypes for tolerance to thrips (*Thrips tabaci* L.) and purple blotch [*Alternaria porri* (Ellis) (Terri)]. *Int J Bioresource & Stress Manage* 4(4): 561-564.
- Pandey U B (1989) Onion (*Allium cepa* L.) Varietal trial, *Indian Horticulture*, 33:58-62.
- Singh L, Singh S P and Mishra P K (1991), Evaluation of onion varieties at Karnal. AADF Newsletter. XI,3: 3-4.

Received on 04/08/2020

Accepted on 10/11/2020