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Performance of Kharif Onion in Vindhyan Region of Madhya Pradesh

Rajesh Singh[1] P. S. Gurjar[2] and Rajeev Singh[3]

ABSTRACT

A field study was conducted at the farmer's field in Rewa district (M.P.) during *kharif* season of 2008-09 to 2011-12 on Kharif Onion c.v. agrifound darked. Observation was recorded on number of leaves per plant, plant height, neck-thickness, length and width of bulbs, length: width of bulbs, bolting percentage, weight of bulb and bulb yield (q/ha). The results showed a significant difference on number of leaves per plant, plant height, neck-thickness, length and width of bulbs, length: width of bulbs, bolting percentage, weight of bulb and bulb yield. The maximum plant height (42.60 cm), number of leaves per plant (11.0), length of bulb (5.80 cm), width of bulb (8.07 cm), weight of bulb (85.40 g) and bulb yield (265.83 q/ha) were recorded in F_5 and the highest nick thickness (0.90 cm) in F_8, length: width of bulb (0.75) in F_3 and bolting percentage (5.7%) were observed in F_7. However, the minimum plant height (38.97 cm), number of leaves per plant (9.0), length of bulb (4.60 cm), width of bulb (7.0 cm), weight of bulb (72.70 g) and bulb yield (245.77 q/ha) were recorded in F_7 and the minimum nick thickness (0.70 cm) in F_1 and length: width of bulb (0.65) were noted in F_4. The difference in yield parameter was attributed to the management practices followed by the selected farmers.

Onion (*Allium cepa* L.) is an important vegetable as well as condiment grown worldwide. India ranks first in area (16.2%) and second in production (12.0%) of onion in the world. Out of 66.7% lakh tones production, 30% comes from *kharif*, 20% from late *kharif* and 50% from *rabi* seasons. There is lot of variation in season wise productivity. The productivity of *kharif* onion is very low (8-10 t/ha) as compared to late *kharif* and *rabi* (25 t/ha) seasons. Rainy season onion cultivation is a new preface in Eastern India. Mainly for fresh bulbs in off seasons (Singh and Singh, 1999). Standardization of varieties for the off season crop is of paramount importance. Singh *et al*. (1991) and Bhonde *et al* (1992) have reported the performance of some onion varieties for *kharif* and late *kharif* season at Karnal and Nasik respectively. *Kharif* onion is an off-season cultivation of the crop for which standarzation of varieties is of immense utility. Bulbing is a combine effect of photoperiod and temperature at a given location. Over centuries, onion genotypes have adapted themselves to short day conditions of subtropics and tropics. Hence different varieties of long and short durations have been developed due to continuous selection and adaptation to different climatic conditions. In certain varieties, at the time of growth, sudden fall in temperature results in formation of flowers instead of bulb development. Ideal variety of onion depends on its use like export, demand of customer, time of planting etc and for maintaining demand and supply in proper order, both *kharif* and *rabi* crops need to be taken seriously in terms of its planning, enhancing productivity and quality of bulbs. Successful onion production depends on the selection of varieties that are adapted to different conditions imposed by specific environment (Mohanty and Prusti, 2001; 2002). The storage of onion bulbs for long duration in ordinary condition posses a great problem due to high humidity and high temperature from June to September. Storage report indicated that there was 43.9% storage loss of onion in different storage method without curing of bulbs and 31.9% even after curing over the storage period of 4 months (Bhattarai and Subedi, 1998). The loss caused in storage was due to sprouting, rotting and shrinkage. So, farmers are compelled to sale their product at minimum price at harvesting time, whereas there is increase in the price and scarcity of dry onion bulbs from September onwards in the markets. To full fill the demand of onion

[1] SMS (Hort.), [2]SRF, KVK Rewa, JNKVV, Jabalpur and [3]Sr. Scientist Directorate of Seed Research, Mau (U.P.)

during off-season the alternative methods for onion production through sets have been developed but farmers did not fully adopted this technology due to poor yield and difficult to produce and storage of standardizes sets. In India, farmers are growing short duration variety (which requires less than 12 hours photo period) during rainy season through use of seedling, which shares about 39.55% of total onion production in that country (Gautam, 2001).

METHODOLOGY

The study was carried out at farmer's fields in Rewa district (M.P.) during the *kharif* season of 2008-09 to 2011-12. The experiment was conducted in a randomized block design with three replications considering farmers as a replication variety Agrifound dark red. The treatments consist of combinations of nine farmers (F_1, F_2, F_3, F_4, F_5, F_6, F_7, F_8 and F_9). Onion seeds were sown in raised nursery bed starting from 5th June. One protective spray of Bavistin (0.5 ml^{-1} water) was done against damping off in nursery beds. About 15-20 cm and 45 days old seedling were transplanted at a spacing of 15 x 10 cm in a plot 3.0 x 3.0 m. Fertilizers was applied at the rate of 20 t/ha compost and 100:50:100 kg N:P_2O_5:K_2O t/ha. The half dose of nitrogen and full dose of phosphorus and potash were applied at the time of final land preparation and remaining half dose of nitrogen was top-dressed equally two times at 45 and 90 days after transplanting of seedling. Drainage canal was made around the plot of drain the excess water. Weeding and other intercultural operations were carried out as per the normal season onion. Neck fall was not observed in maturity stage during this season so the crop was harvested when flowering stalks started to appear. Immediately after harvesting the green tops were separated leaving 2.5 cm neck. Observation was recorded on number of leaves per plant, plant height, neck-thickness, length and width of bulbs and length: width of bulbs from ten randomly selected plants in each plot. Weight of bulbs was recorded by balance meter. The bulb yield was noted on plot basis. The mean data were statistically analysed according to standard procedure. The final data of each characters recorded during the investigation were analyses statistically by the method of "Analysis of variance". The significance of various treatments was judged as suggested by Fisher (1958) applying "F" test.

RESULTS AND DISCUSSION

The data presented in table 1 indicated that number of leaves per plant was significant at different treatments. The maximum number of leaves per plant were noted in F_5 (11.0), followed by F_1 (10.67) and F_2 (10.33), whereas the minimum number of leaves per plant were obtained in F_7 (9.0), followed by F_6 (9.33) and F_4 (9.67). The highest plant height was recorded in F_5 (42.60 cm), followed by F_1 (42.23 cm) and F_3 (41.67 cm), whereas the lowest plant height was noted in F_7 (38.97 cm), followed by F_6 (39.63 cm) and F_4 (40.20 cm).

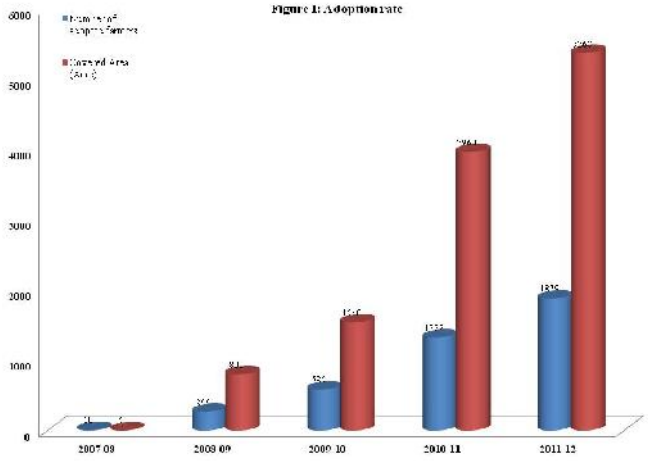
Maximum neck-thickness (0.90 cm) recorded in F_8, which was *at par* with F_6 (0.87 cm) and F_2 and F_9 (0.83 cm each). However, minimum neck thickness of 0.70 cm was recorded in F_1, which was *at par* with F_5 (0.73 cm) and F_4 (0.80 cm). Similar kinds of results for neck-thickness have also been reported by Bhonde *et al*, (1992), Mohanty and Prusti (2001; 2002).

The data presented on bulb length in showed that different treatments were significantly. Maximum bulb length of 5.80 cm was recorded in F_5, followed by F_1 (5.70 cm) and F_3 (5.67 cm), whereas the minimum bulb length of 4.60 cm was observed in F_7, followed by F_6 (4.70 cm) and F_4 (4.80 cm). The largest width of bulb was obtained in F_5 (8.07 cm), which was *at par* with F_1 (7.80 cm) and F_3 (7.60 cm). On the other hand, F_7 possessed the smallest width of bulb (7.00) closely followed by F_6 (7.10 cm) and F_9 (7.27 cm). The highest length: width of bulb was recorded in F_3 (0.75), followed by F_2 (0.74) and F_1 (0.73), whereas the lowest length: width of bulb was noted in F_4 (0.65), followed by F_6 and F_7 (0.66 each), F_8 and F_9 (0.67 each). The highest bolting percentage was noted in F_7 (5.7%), followed by F_6 (5.3%) and F_9 (5.1%), while the lowest bolting percentage was possessed by F_5 (3.8%), followed by F_1 (4.0%) and F_3 (4.3%). The present findings have also been supported by Bhonde, (1998), Bajaj *et al*, (1992) and Ishwori *et al*, (2006).

The data presented on weight of bulb and bulb yield indicated that different treatments were significantly. The highest weight of bulbs was noted in F_5 (85.40 g), followed by F_1 (84.20 g) and F_3 (83.93 g), while the lowest weight of bulbs was possessed by F_7 (72.70 g), followed by F_6 (74.60 g) and F_9 (76.10 g). The present findings have also been supported by Bhonde, (1998) and Bajaj *et al*, (1992) Mohanty and Prusti (2001; 2002). The bulb yield ranged from 245.77 to 265.83 q/ha. The highest bulb yield of 265.83 q/ha was obtained from F_5 which was *at par* with F_1 (262.70 q/ha), F_3 (261.17 q/ha) and F_4 (259.17 q/ha), whereas the lowest bulb yield was recorded in F_7 (245.77 q/ha), followed by F_6 (249.43 q/ha), F_9 (251.57 q/ha) and F_8 (255.77 q/ha). Detailed data for each treatment has been provided in table 1. These findings are in agreement with Mohanty and Prusti (2001; 2002).

Table.1: Performance of kharif onion cv. Agrifound Dark Red at farmer's field

Treatment	Plant height (cm)	No. of leaf/ plant	Neck thickness (cm)	Length of bulb (cm)	Width of bulb (cm)	Length: Width of bulb (cm)	Bolting %	Weight of bulbs (g)	Bulb Yield (q/ha)
F_1	42.23	10.67	0.70	5.70	7.80	0.73	4.0	84.20	262.70
F_2	40.50	10.33	0.85	5.50	7.40	0.74	4.6	81.70	257.33
F_3	41.67	10.00	0.83	5.67	7.60	0.75	4.3	83.93	261.17
F_4	40.20	9.67	0.80	4.80	7.43	0.65	4.4	82.70	259.17
F_5	42.60	11.00	0.73	5.80	8.07	0.72	3.8	85.40	265.83
F_6	39.63	9.33	0.87	4.70	7.10	0.66	5.3	74.60	249.43
F_7	38.97	9.00	0.83	4.60	7.00	0.66	5.7	72.70	245.77
F_8	40.40	10.00	0.90	4.90	7.30	0.67	4.8	78.40	255.77
F_9	41.30	10.33	0.85	4.87	7.27	0.67	5.1	76.10	251.57
SEm±	0.1065	0.4698	0.0465	0.0611	0.0769	0.0107	0.0481	0.1954	0.3524
CD 5%	0.3282	1.4476	0.1432	0.1883	0.2369	0.0329	0.1483	0.6021	1.0860



In the year of 2007-08 10 FLDs conducted in the area and we achieved 100% adoption by the farmers. In the year 2008-09 maximum farmers (around 266) cultivated onion in kharif season and covered 800 acre area of division following in the year 2009-10 more than 500 farmers grow onion and covered 1500 acre land in the division and in the year 2010-11, 4000 acre area has been covered by 1300 farmers and as follow in the year 2011-12 maximum number of farmers 1800-2000 grow onion in kharif season and covered area more than 6000 acre in the whole division (Fig 1).

CONCLUSION

The results showed significant difference on number of leaves per plant, plant height, neck-thickness, length and width of bulbs, length: width of bulbs, bolting percentage, weight of bulb and bulb yield. Farmer (F_5) was found superior in all selected farmers performance of kharif onion cv. Agrifound Dark Red.

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