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PERFORMANCE OF COMMON ONION VARIETIES IN KHARIF SEASONS

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Abstract: Behaviour of 12 varieties of onion was studied during kharif season over two years. The pooled analysis revealed that Arka Niketan, Punjab Red Round, Nasik Red, N 2-4-1, Agrifound Light Red and Arka Pitamber produced small to medium bulb with thinner neck assuring better storage quality. Arka Kalyan recorded the highest yield (21.06 t ha^{-1}) which was at par with Arka Niketan (19.64 t ha^{-1}) and Pusa Madhavi (18.96 t ha^{-1}), while Agrifound Dark Red and N 53 displayed moderately high yield of 18.06 and 17.85 t ha^{-1} respectively. Rabi varieties if grown in kharif season could confer equally good bulb yield as that of kharif varieties. Arka Niketan and Pusa Madhavi with medium bulb, better storage quality and high yield are advocated for commercial cultivation in kharif season.

Key words: *Allium cepa* L.var. *cepa*, bulb yield, common onion, kharif crop, varietal response

INTRODUCTION

Successful onion production depends on the selection of varieties that are adapted to different conditions imposed by specific environment. Kharif onion is an off-season cultivation of the crop for which standardization of varieties is of immense utility. Since little information is available about rainy season onions, it was felt imperative to find out suitable varieties for its successful cultivation under Orissa condition as a basic step towards its popularization. Hence, the present experiment was conducted to study the response of some improved varieties of common onion *(Allium cepa* L. var. *cepa)* during kharif season in order to achieve this objective.

MATERIALS AND METHODS

The investigation was carried out at the Regional Research Station, Bhawanipatna during rainy season of 1997 and 98. Twelve varieties of onion collected from various sources were tested in a randomized block design with four replications. Eight weeks old healthy seedlings of each variety were transplanted on flat beds at a spacing of 15 x 10 cm in a plot of 3.0 x 3.0 m during the first week of August every year. Recommended cultural practices were followed to raise the crops successfully. Ten plants were selected at random in each plot in every year to record the observations on plant height, number of leaves/plant, neck thickness, diameter and weight of the bulb. The bulb yield was accounted on plot basis. The mean data over the years were subjected to statistical analysis according to standard procedure.

RESULTS AND DISCUSSION

Pooled analysis of variance (Table 1) revealed significant mean square estimates for all the characters indicating sufficient diversity among the varieties. The mean squares due to environment were significant for plant height, number of leaves/plant, bulb weight and yield, which demonstrated wide variation between the years of investigation. Significant mean squares due to genotype x environment interaction for all the attributes except diameter of bulb explained differential response of varieties to environmental fluctuation.

The mean performance of the varieties over the years is presented in Table 2. The tallest plant of 40.40 cm was achieved by the cultivar Nasik Red followed by N 53 and Arka Kalyan, whereas the most dwarf plant was produced by Arka Niketan (25.00 cm) followed by Agrifound Light Red and N 2-4-1. Similarly, Pusa Red registered maximum number of leaves/plant (16.50) followed by Arka Kalyan, Pusa Madhavi, N 53 and Arka Niketan. On the contrary, minimum number of leaves/plant was noted in Agrifound Light Red (7.40) followed by N 2-4-1, Arka Pitamber, Agrifound Dark Red, Nasik Red, Punjab Red Round and Pusa Ratnar.

The thickest neck of 1.20 cm was marked in cultivar Pusa Ratnar which was at par with N 53 (1.10 cm), while Arka Niketan acquired the thinnest neck (0.60 cm) followed by Pusa Madhavi and. Agrifound Dark Red (0.7 cm each). The varieties Punjab Red Round, Arka Kalyan (0.80 cm each), Nasik Red, N 2-4-1,

Table 1. Pooled analysis of variance for quantitative characters of common onion during rainy season

Source	df	Mean square					
		Plant height (cm)	No. of leaves/ plant	Neck thickness (cm)	Diameter of bulb (cm)	Weight of bulb (g)	Bulb yield (t ha^{-1})
Environment	1	876.08"	445.52"	0.01	0.41	2692.53"	297.76"
Replication in environment	6	0.24	2.08	0.01	0.10	26.02	2.48
Genotype	11	81.34™	74.53"	0.12"	0.20*	182.62"	10.72"
Genotype x environment	11	16.85*	27.60*	0.02*	0.13	461.47"	18.92"
Pooled error	66	7.66	12.16	0.01	0.10	22.72	2.49

*Significant at 5% level; **Significant at 1% level

Table 2. Mean performance of onion cultivars during rainy season (pooled)

Cultivars	Characters					
	Plant height (cm)	No. of leaves/plant	Neck thickness (cm)	Diameter of bulb (cm)	Weight of bulb (g)	Bulb yield (t ha^{-1})
Nasik Red	40.40	10.20	0.90	4.60	60.50	17.08
N 2-4-1	28.60	8.60	0.90	4.60	50.80	15.08
Agrifound Dark Red	34.60	9.80	0.70	5.00	62.80	18.06
Agrifound Light Red	26.20	7.40	0.90	4.60	56.80	16.85
N 53	38.20	13.60	1.10	4.90	60.50	17.85
Punjab Red Round	32.20	10.80	0.80	4.60	59.80	17.06
Arka Pitamber	32.60	9.40	0.90	4.50	51.62	16.28
Arka Kalyan	36.80	15.30	0.80	4.60	74.60	21.06
Arka Niketan	25.00	12.40	0.60	4.70	65.20	19.64
Pusa Madhavi	34.60	14.20	0.70	4.90	62.40	18.96
Pusa Red	32.80	16.50	0.90	5.00	52.60	16.02
Pusa Ratnar	35.60	11.00	1.20	5.20 "	54.50	16.26
SE(m)±	1.40	1.74	.0.05	0.16	2.38	0.79
CD(0.05)	4.04	5.02	0.13	0.33	6.86	2.27

Agrifound Light Red, Arka Pitamber and Pusa Red (0.90 cm each) also maintained thinner neck than other varieties denoting that they could complete their growth in kharif season. In a late kharif season trial, Bhonde *et al.* (1992) found thinner neck for Arka Niketan and Agrifound Light Red.

The biggest bulb of 5.20 cm diameter was noticed in Pusa Ratnar followed by Pusa Red, Agrifound Dark Red, N 53 and Pusa Madhavi, whereas Arka Pitamber expressed the least diameter of bulb (4.50 cm) followed by Nasik Red, N 2-4-1, Agrifound Light Red, Punjab Red Round, Arka Kalyan and Arka Niketan. Similarly, the largest bulb of 74.60 g weight was observed in case of Arka Kalyan while the smallest bulb (50.80 g) was possessed by N 2-4-1, which was at par with Arka Pitamber, Pusa Red, Pusa Ratnar and Agrifound Light Red. Remaining varieties exhibited medium weight for bulb. The thin neck trait coupled with small to medium size of bulb was identified for Arka Niketan, Punjab Red Round, Nasik Red, N 2-4-1, Agrifound Light Red and Arka Pitamber depicting their potentiality for extended storage life (Patil and Kale, 1985). Arka Niketan and Agrifound Light Red have already proved their concealed storage quality (Bhonde, 1998 and Bajaj *et al,* 1992).

The highest bulb yield of 21.06 t ha^{-1} was obtained from the cultivar Arka Kalyan that was at par with Arka Niketan (19.64 t ha^{-1}) and Pusa Madhavi (18.96 t ha^{-1}), whereas moderately high yield of 18.06 and 17.85 t ha^{-1} was realised from Agrifound Dark Red and N 53 respectively. Bhagchandani *et al.* (1972), Pandey (1989) and Singh *et al.* (1991) reported better performance of N 53 and Agri-

found Dark Red than other varieties, while Bhonde *et al.* (1992) did not find significant difference in performance among 12 varieties tested in kharif season. Out of these varieties, Arka Kalyan, Agrifound Dark Red and N 53 are recommended for cultivation in rainy season, whereas Arka Niketan and Pusa Madhavi are recommended for winter season cultivation. This elucidated that rabi varieties if grown in kharif season could produce equally good bulb yield as that of kharif varieties. Similar observations were also made by Bhonde *et al.*(1992).

The present investigation showed that among the good performing varieties, Arka Kalyan and Agrifound Dark Red displayed larger bulbs reflecting poor storage life, while N 53 manifested thicker neck as well as larger bulb illustrating incomplete growth and poor keeping quality. Thus, Arka Niketan and Pusa Madhavi were regarded as supplantation to Arka Kalyan, N 53 and Agrifound Dark Red for kharif cultivation. Keeping in view the higher yield, better storage quality and medium bulb, Arka Niketan and Pusa Madhavi were suggested for large-scale cultivation in kharif season.

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