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RESPONSE OF DIFFERENT CULTIVARS AND BULBSET GRADES ON YIELD AND RELATED CHARACTERS IN *KHARIF* ONION (*ALLIUM CEPA* L.)

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ABSTRACT

An experiment was conducted to find the response of three cultivars and three bulb set grades on yield and related characters in onion. Maximum bulb weight was recorded from variety N-53. Also A grade sets produced bulbs with maximum size and weight. N-53 x A grade bulb sets was key combination for maximum bulb size & weight. Variety PB-48 produced maximum yield with tops where as maximum yield without tops was produced by variety N-53. Variety N-53 also produced bulbs with higher average weight and with maximum size, whereas variety PB-48 produced bulbs with lowest weight and with minimum size. The lower bulb yield in PB-48 can be attributed to the increase in top production at the expense of underground bulb and vice versa in case of variety N-53.

Key Words: Bulb set, cultivar, Kharif season onion, Yield components.

ONION (*Allium cepa* L.) is extensively grown in India for its bulb production. In Punjab, it is mostly grown as a rabi crop which is mainly available from May to September. At present onion, as a kharif crop, is being cultivated in some non traditional areas in India, including Punjab. In summer, high temperature and heavy rainfall make it all but impossible to grow onion. However, recently a new technique to raise kharif onion through bulb sets is one of the alternatives which can be used to tackle the problem. Successful raising of nursery during summer season is the main problem for growing of kharif season crop. This technique involves sowing of seed during March to obtain bulbsets in the month of June. These bulb sets are then lifted and stored until second half of August when transplanting of these bulb sets is done in the main field. The marketable crop is ready during December-January, when rates are exorbitant. Prevalence of high temperature during summer season results in high mortality of seedlings and farmers have to sow nursery repeatedly. Thus, there was an imperative need to standardise the techniques for raising kharif onion, through production of bulbsets which can overcome the problem faced by growers for raising nursery under unfavorable weather conditions.

MATERIALS AND METHODS

The present experiment was conducted at the Vegetable Experimental Farm, Punjab Agricultural University, Ludhiana on raising of kharif onion through bulbset technique (1993-

94). The bulbsets were raised on 20 cms. raised beds. The seed sowing was done @ 12.5 kg/ha/500 square m for all three cultivars namely N-53, PB-48 and PBR, all the three varieties were suitable for green onion production. The sowing of seed was done in middle of March. Added 12 kg farm yard manured/marla (25 sq.m,). Treat the seed before sowing with 3g of captan/thiram per kg of seed. Sow the seed 1 to 2 cms deep in lines with 5cms spacing the seed should be uniformaly sown in these lines and covered with a thin layer of farmyard manure layer. The seed should be sown in proper moisture conditions. First irrigation should be given just after sowing with the help of sprinkler. The nursery bed should be irrigated twice a day. The nursery bed should be protected from high temperature by covering it during the hot heat of the day. The bulb sets produced from each cultivars were harvested separately from nursery beds in the month of June. The tops were removed and bulb sets graded into different grades. The bulb sets were graded into three grades viz A,B and C. The grading was done on the basis of size with greater than 2 cms sized bulbsets being alloted A grade, 1.5 – cms in the B grade and below 1.5 cms in the C grade category. These bulb sets were then stored in hessian cloth bags till planting in the field. The transplanting of the bulb sets was carried in split plot design with three replications. The varieties were kept in the main plot treatments whereas bulb set sizes were alloted to the sub plots. The transplanting was done in first week of September in 3.0 x 1.8m sized plots at 15 x 7.5 cm spacing. The observations were recorded on number of days taken to maturity, total yield with tops, total yield without tops, bulb weight and size of bulb. The data were statistically analysed by the method of analysis of variance as suggested by Cochran and Cox (1967).

RESULTS AND DISCUSSION

The total duration was recorded from the date of transplanting of bulb sets in the field to final harvesting of bulbs. It is quite obvious from Table-1 that N-53 variety was earliest in maturity (107.12 days) followed by PB-48 and PBR variety. This also confirms observation of Pandey (1989) for N-53 as an earliest and assured yield variety.

Table 1. Effects of varieties and bulb set grades on days taken to maturity

Varieties/ Bulbset grades	*N-53*	*PB-48*	*PBR*	*Mean*
Grade-A	103.49	108.99	110.24	107.57
Grade-B	107.00	111.58	111.66	110.08
Grade-C	110.88	114.83	113.91	113.21
Mean	107.12	111.80	111.93	
C.D. for varieties		= 0.76		
C.D. for bulbset grades		= 0.48		
C.D. for vars x Bulbset Grades		= 0.84		

A study of Table 2 shows that all the three varieties did differ statistically from each other for total yield with tops. There was appreciable variation ranging from (37.70 kg in PB-48) to (28.56 kg in N-53) in respect of total yield with tops. Vandemark (1977) was also of the view that most gardners prefer while sets for producing green onions. These findings are also in close conformity to the recommendations of Chadha and Sidhu (1986). They suggested white globe set and PB-48 onion varieties for green bulbs. The critical appraisal of the table further reveals that the bulbset grades A, B and C also differ significantly for total yield with tops. Highest yield with tops was produced by A grade bulb sets (35.93 kgs) followed by B grade (32.90 kgs) and C grade bulb sets (29.97 kgs). The interaction effect with set grades was, however non significant although there was a variation in yield tops ranging from a minimum of 27.24 kgs in N-53 x C grade combination to a maximum of 40.50 kgs in PB-48 x A grade combination.

Table 2 : Effects of varieties and bulb set grades, on total yield with tops (kg/plot)

Varieties/ Bulbset grades	*N-53*	*PB-48*	*PBR*	*Mean*
Grade-A	30.02	40.50	36.63	35.93
Grade-B	28.45	39.29	31.00	32.90
Grade-C	27.24	33.26	29.41	29.97
Mean	28.56	37.70	32.34	
C.D. for vars		= 6.28		
C.D. for bulbset grades		= 2.19		
C.D. for vars x bulbset grades		= N.S.		

So for as total yield without tops is concerned (Table 3), there were significant differences in yield amongst the varieties and an appreciable higher yield was recorded from N-53 variety (16.06 kgs/plot). The data further revealed that different bulb sets grades behaved differently for total yield without tops. A grade sets yielded maximum (17.55 kgs) and more than grade B (13.73 kgs) and Grade C (8.61 kg) sets. Regarding interaction between varieties and bulb set sizes the data showed that maximum yield was obtained from N-53 x A grade sets (19.60 kgs) and lowest yield was recorded from PB-48 x C grade sets (7.03 kg/plot). The data on average bulb wt (g) was also recorded for these varieties (Table 4). Variety N-53 gave the bulbs with maximum average wt. i.e. 46.59g and PB-48 gave the highest yield with tops however produced bulbs with a low average wt. of 36.58g. The highest bulb wt. (51.26g) was recorded from A grade sets and lowest 27.88g) form C grade sets. In case of combinations between various varieties and set grades, the above mentioned table shows that N-53 x A grade yielded maximum wt. 54.03g compared to other two combinations.

Table 3. Effect of varieties and bulbset grades on total yield without tops (*kgs/plot*)

Varieties/ Bulbset grades	*N-53*	*PB-48*	*PBR*	*Mean*
Grade-A	19.60	15.54	17.52	17.55
Grade-B	17.50	12.00	11.76	13.73
Grade-C	11.08	7.03	7.73	8.61
Mean	16.06	11.52	12.33	
C.D. for vars		= 3.46		
C.D. for bulbset grades		= 0.64		
C.D. for vars x bulbset grades		= 1.11		

Table 4. Effect of varieties and bulbset grades on bulb weight (g)

Varieties/ Bulbset grades	*N-53*	*PB-48*	*PBR*	*Mean*
Grade-A	54.03	50.04	49.71	51.26
Grade-B	47.85	45.48	39.72	42.34
Grade-C	37.89	20.24	25.52	27.88
Mean	46.59	36.58	38.31	
C.D. for vars		= 8.18		
C.D. for bulbset grades		= 2.20		
C.D. for vars x bulbset grades		= 3.82		

Data presented in Table 5 on size of bulb (length x breadth cms) exhibits significant differences among different varieties. N-53 gave the largest size bulbs (12.26 cms) followed by PBR (10.63 cms) and PB-48 (9.60 cms). Data also showed significant differences of sets behaving differentially for bulb size. Largest bulbs (13.13 cms) were harvested from the plots where A grade sets were used. However, C grade sets produced very small sized bulbs. Largest sized bulbs were obtained under the influence of N-53 x A grade treatment and lowest sized bulbs were from PB-48 variety with C grade. The variety N-53 produced the bulbs with highest average weight i.e. 46.59 g and maximum bulb size i.e. 12.26 cm maximum yield without tops of 16.06 kg/plot. On the other hand the variety PB-48 although produced maximum yield with tops of 37.70 kg/plot produced bulbs with minimum size of 9.60 cm and of lesser weight of 36.58 gm. The increase in tops with lower bulb yield can be attributed to the increase in top production at the expense of underground bulb and vise versa in case of variety N-53. These findings are in conformity with Pandey (1989) who has ranked onion N-53 as an assured yield variety with earliest yields.

Table 5 : Effect of varieties and bulb set grades, on size of bulb (cms)

Varieties/ Bulbset grades	*N-53*	*PB-48*	*PBR*	*Mean*
Grade-A	14.33	11.87	13.20	13.13
Grade-B	11.88	9.81	11.28	10.99
Grade-C	10.59	7.12	7.41	8.37
Mean	12.26	9.60	10.63	
C.D. for vars		= 1.34		
C.D. for bulb set grades		= 0.61		
C.D. for vars x bulb set grades		= NS		

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