

# Autumn Crop Production through Sets in Eight Onion Cultivars

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## ABSTRACT

Eight onion cultivars were evaluated for yield and yield contributing characters. Onion sets were sown in autumn season. Both cultivar and year and their interaction was found to be highly significant for most of the yield and yield contributing characters. Cultivar Dark Red showed maximum bulb diameter (5.85 cm), number of rings per bulb (10.2), bulb weight (90.75 gm), yield per plant (107.5 g) and total yield (9917 kg/ha). Leaf length was maximum (46.64 cm) in cultivar Faisal Red while highest leaf weight (30.08 g) was observed in Red Imposta. Maximum number of leaves (12.5) were given by Phulkara while highest neck diameter (1.47 cm) and dry matter contents (15.33) was yielded by cultivar Pk-10321. All the yield contributing characters showed different response in the two years. It might be due to certain environmental effects as most of the characters are quantitative in nature. Dark Red might be recommended as the best yielding cultivar for autumn season plantation through sets.

**Key Words:** Autumn Crop Production; Sets; Eight; Onion Cultivars

## INTRODUCTION

Raising onion in autumn season through sets is being used widely in world but relatively new in Punjab. Vanparys (1999a) evaluated shallot sets and recommended cultivar Sante for cultivation on high sandy loam soils. Vanparys (1999b) evaluated onion cultivars at Rumbek and Belgium and recommended Glacier and Swift for cultivation on high sandy loam soils. Shimeles and Dessalegne (1999) recommended Melkam as new onion cultivar for production in less irrigated land. Munoz *et al.* (7) reported that use of small bulbs as planting material could successfully produce marketable onions. Sato *et al.* (1999) reported that a new hybrid, Toyohira, was 22.2% softer with 25% thicker scales. Callens *et al.* (1998) reported Upton hybrid with the best yield and quality while Bolanos (1989) found Granex as the best yielding cultivars. Shimeles (1998) selected short day type onion cultivars Regal PVP, Gladalan Brown, Red synthetic, Early Red, Agrifound, Light red and Ragia after evaluation. Onion sets (1.5-2.0 cm) grown from December to May stored (May-July) and transplanted in 1st week of August yields one month earlier harvest of bulbs and fetching higher market prices.

The study was launched to evaluate cultivars for onion crop production through sets in autumn. Ten yield attributes were studied. These cultivars may further be incorporated in breeding programme for crop improvement.

## MATERIALS AND METHODS

Onion sets of eight cultivars viz. Faisal Red, Desi Red, Phulkara, Pk-10321, Red Imposta, Robina, Dark Red and Pusa Red were produced by sowing the seed during 2<sup>nd</sup> fortnight of January. Sets of desirable size (1.5-2.0 cm) were selected and stored until last week of July 2000 & 2001.

Sets were planted after dipping in 0.2% solution of Dithane M-45 for five minutes to keep it clean against fungal diseases. During both years, layout was done following Randomized Complete Block Design with three replications. Plot size was maintained 7M X 1.40 M. Onion sets were planted on both side of the 70 cm apart ridge keeping set to set distance 10 cm. Sets were planted after noon in irrigated field to get better sprouting. Recommended agronomic practices and plant protection measures were followed. Crop was harvested during second fortnight of November. Data regarding plot yield (bulb), leaf length and weight, number of leaves per plant, diameter of neck and bulb, number of rings per bulb, single bulb weight, dry matter contents and plant weight of 10 guarded plants was recorded. Data was analyzed statistically by factorial design (Steel & Torrie, 1980).

## RESULTS AND DISCUSSION

Highly significant differences were found among varieties. Effect of year was found to be highly significant except three yield contributing characters like number of leaves, diameter of neck and leaf length while diameter of bulb & number of rings per bulb were found to be significantly different from others. The interaction was also significantly different except for characters like diameter of bulb and neck and plot yield. Onion bulb size (diameter) and number of rings per bulb are very sensitive characters and are affected by both factors and their interaction.

**Effect of cultivar on yield and yield contributing characters.** Maximum yield per hectare (9917 kg) was found in cultivar Dark Red followed by cultivar Red Imposta with its yield (9016 kg/ha). The cultivar Dark Red also showed maximum yield per plant (107.50 g), single bulb weight (90.75 g), diameter of bulb (5.858 cm) and

**Table I. Effect of cultivars on yield and yield contributing characters**

Cultivar	Leaf length (cm)	Leaf weight (gm)	No. of Leaves	Diameter of neck (cm)	Diameter of bulb (cm)	No. of rings/bulb	Bulb weight (gm)	Dry Matter (%)	Yield per plant (gm)	Yield (kg/ha)
Faisal Red	46.67	21.30	12.00	0.83	5.47	9.05	63.25	13.17	84.55	6873
Desi Red	39.33	15.83	11.33	0.64	5.03	8.05	69.67	13.50	85.50	7889
Phulkara	39.00	13.17	12.50	0.83	4.91	9.33	64.00	11.83	77.17	8817
PK-10321	43.50	15.25	10.83	1.47	5.52	8.42	68.92	15.33	84.17	8349
Red Imposta	37.83	30.08	9.67	1.36	5.54	7.85	67.08	12.50	97.17	9016
Robina	36.83	21.35	9.33	0.92	3.93	7.48	61.98	12.00	88.33	8429
Dark Red	44.67	16.75	11.33	1.29	5.85	10.19	90.75	11.00	107.50	9917
Pusa Red	34.67	25.17	10.50	0.64	4.16	7.00	46.50	13.00	71.67	5587
<i>L.S.D. (0.05)</i>	3.82	5.77	1.47	0.15	0.63	0.80	7.25	1.21	6.23	1956
<i>L.S.D. (0.01)</i>	5.15	7.77	1.98	0.20	0.85	1.08	9.76	1.63	8.44	2634

**Table II. Effect of year on yield and yield contributing characters in various onion cultivars**

Varieties	Leaf length (cm)		Leaf weight (g)		No. of Leaves		Diameter of neck (cm)		Diameter of bulb (cm)		No. of rings/bulb		Bulb weight (gm)		Dry matter (%)		Yield per plant (g)		Yield (kg/ha)	
	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
Faisal Red	46.67	46.61	31.27	11.33	12.00	12.00	0.80	0.85	5.50	5.30	9.33	8.78	57.83	68.67	13.33	13.33	89.10	80.00	9556	4190
Desi Red	38.67	40.00	19.67	12.00	11.00	11.67	0.63	0.64	4.90	5.10	7.88	8.22	68.00	71.33	11.67	15.33	87.67	83.33	10952	4825
Phulkara	39.00	39.00	14.00	12.30	11.67	13.33	0.83	0.84	4.80	4.90	9.48	9.18	69.33	58.67	11.33	12.33	83.33	71.00	10571	7063
PK-10321	41.00	46.00	15.83	14.67	11.00	10.67	1.47	1.46	5.21	5.84	8.40	8.44	59.17	78.70	13.33	17.33	75.00	93.33	9778	6921
Red Imposta	38.00	37.67	38.17	22.00	9.33	10.00	1.37	1.37	5.20	5.80	7.71	8.00	46.17	88.00	12.00	13.00	84.37	110.00	10095	7937
Robina	34.33	39.33	19.53	23.17	7.67	11.00	0.90	0.95	3.83	4.03	7.63	7.93	60.80	63.17	11.00	13.00	80.33	86.33	10286	6571
Dark Red	48.33	41.00	18.83	14.67	13.00	9.67	1.36	1.20	5.73	5.98	12.17	8.22	82.83	98.67	11.00	11.00	101.60	113.30	12857	6968
Pusa Red	30.00	39.3	25.60	24.60	9.33	11.60	0.61	0.67	3.61	4.70	6.81	7.20	44.30	48.67	12.67	13.30	70.00	73.30	6825	4349
<i>LSD (0.05)</i>	5.14		8.30		2.08		0.21		0.90		1.13		10.30		1.70		8.90		2766	
<i>LSD (0.01)</i>	7.30		10.90		2.80		0.28		1.20		1.52		13.80		2.30		11.90		3725	

number of rings per bulb (10.19). PK-10321 showed better performance diameter of neck (1.47 cm) and dry matter contents (15.33%). Phulkara gave maximum leaves per plant (12.50) and Red Imposta produced maximum leaf weight (30.08 g). The maximum leaf length (46.67 cm) was observed in Faisal Red. The variety Dark Red is recommended for crop production through sets during autumn season.

**Effect of year on yield contributing characters in onion cultivars.** During 2000 variety Dark Red gave the highest yield of 12857 kg/ha. followed by Desi Red, Phulkara, Robina and Red Imposta with yield values of 10952, 10571, 10286 and 10095 kg/ha respectively but statistically all these varieties remained at par. During 2001 variety Red Imposta gave the highest yield of 7937 kg/ha followed by varieties Phulkara, Dark Red, PK-10321 and Robina with yield values of 7063, 6968, 6921 and 6571 kg/ha. respectively. If we consider both the years, then varieties Phulkara, Red Imposta, Robina and Dark Red gave best performance. Yield per plant was significantly higher (101.6 g) in variety Dark Red. Again during 2001 this variety gave the highest yield (113.3 g) followed by variety Red Imposta with yield value of 110.00 g/plant, but both these varieties statistically remained at par.

During 2000 dry matter contents were highest (13.33%) in varieties Faisal Red and PK-10321 each followed by varieties Pusa Red, Red Imposta and Desi Red with values of 12.67, 12.00 and 11.67%, respectively, but statistically there is no difference in these varieties. During 2001 variety PK-10321 gave significantly the highest dry matter contents (17.33%). The same variety performed better in both the years. Bulb weight was significantly

higher in variety Dark Red during 2000 and 2001 with values of 82.83 and 98.67 gm respectively. Rings per bulb were significantly more (12.17) in variety Dark Red during 2000. During 2001 more rings were recorded in variety Phulkara followed by varieties Faisal Red, PK-10321, Desi Red, and Dark Red with values of 8.78, 8.44, 8.22 and 8.22 respectively but statistically all these varieties remained at par. During both the years Dark Red gave best performance.

Diameter of bulb during 2000 was more in variety Dark Red (5.73 cm) followed by varieties Faisal Red, PK-10321, Red Imposta and Desi Red with values of 5.50, 5.21, 5.20 and 4.90 cm respectively but statistically these varieties remained at par. During 2001 variety Dark Red gave the maximum diameter of bulb (5.98 cm) followed by PK-10321, Red Imposta, Faisal red and Desi Red with diameter of bulb 5.84, 5.80, 5.30 and 5.10 cm respectively but statistically remained at par. During both the years all the same varieties gave good performance. Diameter of neck during 2000 was minimum (0.61 cm) in variety Pusa Red followed by varieties Desi Red and Faisal Red with values of 0.63 and 0.80 cm respectively but statistically remained at par. During 2001 variety Desi Red showed minimum thickness of neck (0.64 cm) followed by varieties Pusa Red, Phulkara and Faisal Red with values of 0.67, 0.84 and 0.85 cm respectively but statistically there was no difference in these varieties. Leaves per plant during 2000 were maximum (13.00) in variety Dark Red followed by varieties Faisal Red, Phulkara, Desi Red and PK-10321 with values of 12.0, 11.67, 11.0, 11.0 respectively but statistically there was no difference in their values. During 2001 more leaves (13.33) were recorded in variety Phulkara followed by varieties Faisal Red, Desi Red and Pusa Red with values of

12.0, 11.67 and 11.60 respectively but statistically remained at par.

During 2000 leaf weight was more (38.17 g) in variety Red Imposta followed by variety Faisal Red with value of 31.27 g but statistically there was no difference in these varieties. During 2001 highest leaf weight (24.60 g) was recorded in variety Pusa Red followed by varieties Robina and Red Imposta with values 23.17 and 22.0 g respectively but statistically remained at par. Variety Red Imposta gave maximum leaves weight during both the years.

During 2000 leaf length was highest (48.33 cm) in variety Dark Red followed by variety Faisal Red with value of 47.73 cm but statistically there was no difference in these varieties. During 2001 variety PK-10321 gave more leaf length (46.0 cm) followed by varieties Faisal Red and Dark Red with respective lengths of 45.6 and 41.0 cm. Varieties Faisal Red and Dark Red gave more leaf length during both the years under study.

The cultivar performance showed difference. It may be attributed to the change in environmental factors with the change of year of study. The yield and yield contributing characters, which are mostly quantitative in the cultivars showed poor performance during year 2001. Cultivar Pk-10321 gave maximum dry matter contents during both the

years and might be used in breeding programs for improving storage life of other better yielding cultivars.

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