

## PRODUCTION POTENTIAL OF DIVERSE ONION GENOTYPES RAISED THROUGH SETS

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Nine onion (*Allium cepa* L.) genotypes were examined to obtain the early onion bulb production through sets. The genotypes did not differ significantly for number of green leaves, whereas significant differences were observed among the genotypes for sets diameter, leaf length, neck diameter, bulb diameter, fresh weight per bulb and bulb yield ha<sup>-1</sup>. The Hybrid Yellow Granex showed superiority and more adaptability over all other genotypes under Faisalabad conditions.

**Key words:** *Allium cepa*, bulb, sets, genotypes

### INTRODUCTION

The cultivation of onion (*Allium cepa* L.) is accomplished by different methods like seed to bulb, seed to seedling to bulb and previous years sets to bulb production. Sets, small dry onion bulbs, which generally mature 3-4 weeks earlier and tend to yield higher than seeded onions, are commercially used to produce early green onions, but they can also be used for dry bulb production. While, growing onion from larger sets tend to produce higher yield and mature earlier than those produced from smaller sized sets, but they are more subject to split and doubles and are more likely to bolt (Suh and Kim, 1996). Therefore, smaller sets (less than 1.25cm in diameter) are mostly used for dry bulb production and the larger sets (greater than 1.87cm in diameter) are considered more suitable for the production of green onions (Swiader *et al.*, 1992). The sets are obtained by planting seeds very thickly so that plants compete with one another for growing space, moisture and nutrients.

In Pakistan, onions are commonly grown through nursery seedlings and transplanting 10-12 weeks old seedlings to the field for bulb production. In Punjab, sowing of the main crop of onion is done during the months of September-October which is harvested in April-May. In Punjab, particularly during these months return is very low due to bulk produce and low market prices. Growing onions through sets is not very common practice for bulb production in Pakistan. It is a replanting of onion sets in the month of August and crop is ready for harvest in the month of December, which is four months earlier than harvesting of normal crop. At this time, market prices are very high. According to reports, the prices are almost three times higher during October-March than the normal seasons produce (April-May) (Personal Survey). Hence, the cultivation of onions through sets may bring a change and improve the life style of the poor farmers.

Therefore, the present studies were carried out to observe the performance of different local and exotic genotypes for early bulb production through onion sets under Faisalabad conditions.

### MATERIALS AND METHODS

Seeds of three local onion genotypes Dark Red, Early Red and Faisal Red; six exotic genotypes Roxa IPA-3, Red Creole, Granex-33, Granex-429, Red Bone and Hybrid Yellow Branex, were used in the present studies. The seeds were sown on 14<sup>th</sup> February, 1999 on a well prepared piece of land to prepare small onion sets in nursery at the Experimental Vegetable Area, Department of Horticulture, University of Agriculture, Faisalabad. The sets were harvested on 28<sup>th</sup> May, 1999 and stored under room temperature till their replanting for bulb crop.

The onion sets were replanted on ridges in the field on 13<sup>th</sup> August, 1999 for the production of dry onion bulbs. The experiment was laid out in a Randomised Complete Block Design (RCBD) with three replications. Ridge to ridge and plant to plant distances were maintained as 60cm and 15cm, respectively. First irrigation was applied immediately after planting of sets and subsequent irrigations were given at 7-15 days interval keeping in view the need of the crop. Finally the crop was harvested on 28<sup>th</sup> December, 1999.

Ten plants were tagged randomly in each plot in each replication and data were recorded for set diameter (cm), number of green leaves per plant, maximum leaf length per plant (cm), neck diameter (cm), bulb diameter (cm), fresh weight per bulb (g) and bulb yield per hectare (tonnes). The data collected were analysed statistically using Fisher's analysis of variance technique. The treatment means were compared using Duncan's New Multiple Range test at 5% probability level (Petersen, 1994).

## RESULTS AND DISCUSSION

Statistical analysis of the data for set diameter (cm) indicated highly significant differences among the genotypes. All the local genotypes produced large sized sets while all the exotic genotypes small sized sets (Madisa and Midmor, 1993; Yamashita and Takase, 1988).

where neck size was thick there bulb size was also large (Lancaster *et al.*, 1996; Galmarini and Gaspera, 1995).

Data on fresh weight per bulb (g) revealed highly significant differences among the genotypes. Hybrid Yellow Granex produced maximum weight 328.70 g/bulb. While Cv. Red Bone gave minimum fresh weight of 32.77 g/bulb. This may be due to genetic

**Table 1. Performance of some local and exotic onion genotypes for bulb production under Faisalabad conditions**

Genotypes	Sets diameter (cm)	Number of leaves / plant	Maximum leaf length (cm)	Neck diameter (cm)	Bulb diameter (cm)	Fresh weight / bulb(g)	Yield/ha (tonnes)
Dark Red	2.52a	14.67b	42.50b	1.40e	3.57f	45.92g	5.61g
Early Red	2.76a	13.67b	49.87b	1.26e	3.65f	65.97f	8.06f
Faisal Red	2.54a	12.67b	54.60b	2.30cd	4.78d	65.82f	8.03f
Roxa IPA-3	1.42b	19.33ab	75.80a	2.70b	7.53a	302.8b	37.01b
Red Creole	1.25b	11.00b	52.90b	2.56bc	6.40bc	233.0c	28.47c
Granex-33	1.48b	11.33b	54.00b	2.07d	4.68de	121.30e	14.82e
Granex-429	1.15b	19.00ab	55.83b	2.22cd	6.99b	207.80d	16.93d
Red Bone	1.20b	14.33b	47.90b	2.08d	4.44e	32.77h	3.99h
Hybrid Yellow Granex	1.36b	24.33a	75.80a	3.35a	6.95b	328.70a	40.18a

Means followed by same letter in columns are not significantly different at 0.05 probability level (DMR test)

The differences among the genotypes for number of green leaves per plant were non-significant. Individual comparison of the cultivars showed that plants of Hybrid Yellow Granex developed more leaves (24.33) than plants from other cultivars (Table 1). It may be pointed out that plants of Cv. Red Creole possessed the least number of leaves per plant (11.00). It showed that this parameter is directly related to varietal characteristics (Lancaster *et al.*, 1996). The results for leaf length (cm) per plant showed that Hybrid Yellow Granex and Cv. Roxa IPA-3 gave the maximum leaf length whereas Cv. Dark Red minimum leaf length. It has been observed that the exotic genotypes had smaller sets diameter and produced longer leaves than the local genotypes, while the reverse was true for the latter group. It is postulated that where leaves elongated rapidly the set size remained small.

Data related to the neck diameter (cm) per bulb showed highly significant differences among the genotypes. Hybrid Yellow Granex produced bulbs with large neck diameter of 3.35 cm, while bulbs produced from Cv. Early Red had the smallest diameter of 1.26cm of all the genotypes examined (Table 1).

As regard the bulb diameter Cv. Roxa IPA-3 produced maximum bulb diameter of 7.53cm while Cv. Dark Red showed minimum diameter of 3.57cm. The bulb size appeared to follow the pattern of neck size. Hence,

differences among the genotypes and their adaptability to prevailing environmental conditions. Hybrid Yellow Granex proved to be the best for fresh weight per bulb as already reported in a few studies (Synnevag, 1990; Farraq, 1995 and Salazer *et al.*, 1995).

Bulb yield per hectare (tonnes) again showed significant differences among the genotypes. Hybrid Yellow Granex produced maximum bulb yield of 40.18t/ha, while Cv. Red Bone produced minimum yield of 3.99kg/ha. As reported by Vissor and De-Vissor, 1991 and Madisa and Midmore, 1993, the reasons for higher yield of the Hybrid Yellow Granex may be its genotypic superiority and for suitability to the local conditions of Faisalabad.

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