

EVALUATION OF CAULIFLOWER GERMPLASM FOR EARLINESS

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ABSTRACT

This experiment was carried out during 2011 at Vegetable Crops Research Program, Horticulture Research Institute, National Agricultural Research Center, Islamabad to assess the production capabilities of different cauliflower genotypes under summer condition of Islamabad. The morphological characteristics studied were plant height (cm), plant spread (cm), days to maturity, mature plant size (cm), single plant weight (g), single curd weight (g), yield (t/ha) based on curd weight. The maximum yield (17.767 t/ha, 1415.7 t/ha and 1273.8 t/ha) was recorded in the genotype, TSX- C37 (F₁), Taxila (Local) and White Corona, respectively as compared to the other genotypes. The highest value for growth parameters were recorded in plant spread (42.35cm), days to maturity (85.14) and mature plant size (68.54cm) in cv. First Early followed by cv. Second Early with plant spread (45.73cm), days to maturity (90.56 days) and mature plant height (76.45cm) and cv. Taxila (Local) with plant spread (45.05cm), days to maturity (94.05) and mature plant size (37.07cm).

Key Words: *Brassica oleracea*, earliness, yield, mature plant, curd weight.

INTRODUCTION

Cauliflower (*Brassica oleracea*), of family crucifereae is a good source of mineral, carbohydrates and vitamin A and C. The total production of cauliflower is 16.88 tones per hectare (Government of Punjab 2010). Pakistan contributes only 0.44 % to world vegetable production and ranks 19th in cauliflower production in the world (Anon, 2008). Cauliflower is extensively grown in winter season characterized by cool temperature (Rahman *et al.*, 2007).

Mostly the farmers are growing winter vegetables during October to November and when such vegetables are harvested, the markets are flooded with these vegetables and the growers sometimes are even not getting back their cost of production. Whereas, the prices of the early season are always two to three times higher than their normal season availability. It is very difficult to grow cauliflower during summer season for early crops because cultivars grown in Pakistan are low in yield and their quality can not compete with those grown in the developed countries. Sciortino and Iapichino (2009) evaluated new cultivars (F₁ hybrids) of cauliflower (*Brassica oleracea* L. var. *botrytis* L.). The aim was the introduction of new varieties which can fill the gap from mid May to mid July. The F₁ hybrids ('White-Flash', 'Milky-Way' and 'White Excel') were found best in term of yield. There is a need for heat tolerated cauliflower varieties that are suitable for summer season. The present study was planned to assess the production capabilities of different cauliflower genotypes in summer season.

MATERIALS AND METHODS

The experiment was carried out during 2011 at Vegetable Crops Research Program, Horticulture Research Institute (HRI), National Agricultural Research Center (NARC), Islamabad. Seeds of cauliflower were sown on raised beds containing a mixture of soil, sand and well rotten farmyard manure in equal ratio. Nursery of cauliflower was transplanted 40 days after sowing using Randomized Complete Block Design (RCBD). Row to row and plant to plant distance was maintained at 75 cm and 50 cm, respectively. The experiment was conducted to assess the potential of available cauliflower germplasm for curd yield under hot climatic conditions. Six genotypes namely Taxila (Local), First Early, Second Early, TSX- C37 (F₁), Snow Crown and White Corona were included in the trial. The data were recorded on mature plant height (cm), plant spread (cm), days to maturity, single plant weight (g), single curd weight (g), and total yield based on curd weight (t/ha) and analyzed for ANOVA and the means were separated using Duncan's Multiple Range Test (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

During the present investigation, 6 genotypes of cauliflower were screened for yield potential during summer season.

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Plant Spread (cm)

For plant spread all genotypes showed significant differences (Table1). Maximum (45.73) plant spread was observed in genotype Second Early followed by (45.05) Taxila (Local). Genotype Snow Crown showed Minimum (37.70) plant spread. These results are in accordance with the findings of Mihov and Antonova (2009).

Days to Maturity

Significant difference was recorded among the treatments for days to maturity of plants (Table 1). Cultivar 'First Early (85.14) matures earlier and followed by TSX- C37 F1 (94.88) and Taxila (Local) (94.05). Many studies have indicated that the capability of genotypes in maturity difference (Wambani *et al* 2007; El-Rehim, 2003; Batra & Singh, 2000; Ledo *et al.*, 2000; Cardoso, 1999)

Mature Plant size (cm)

Maximum plant size was recorded in genotype Second Early (76.45) closely followed by TSX- C37 F1 (74.11) and Taxila (Local) (73.07) (Table 1). Previously it was reported that genetic improvements of tomato not only depend on the introduction but also on the gradual development of more closely adapted accession suited to local conditions. The genotypic variability has also been reported for cauliflower (Naveen and Tarsem, 2005). Wambani *et al.* (2007), El-Rehim (2003) and Batra and Singh (2000) have reported similar findings in Cole crops.

Table 1. Growth parameters of cauliflower germplasm.

Genotypes	Plant Spread (cm)	Days to Maturity	Mature Plant height (cm)
Taxila (Local)	45.05 A	94.05 A	73.07 ABC
First Early	42.35 AB	85.14 C	68.54 BC
Second Early	45.73 A	90.56 B	76.45 A
TSX- C37 F1	40.08 AB	94.88 A	74.11 AB
Snow Crown	37.70 B	0.000 D	0.000 D
White Corona	40.11 AB	94.05 A	67.45 C
<i>LSD</i>	5.7426	1.7249	5.7043

Means followed by the same letter are not statistically different at the 5 percent level, by the Duncan multiple range test.

Table 2. Yield parameters of cauliflower germplasm.

Genotypes	Single plant weight (g)	Single curd weight (g)	Total Yield Curd weight basis (t/ha)
Taxila (Local)	1415.7AB	513.17B	12.829B
First Early	3773.0A	271.00C	6.7750C
Second Early	1221.2AB	314.63C	7.8658C
TSX- C37 F1	1747.7AB	710.67A	17.767A
Snow Crown	0.000B	0.000D	0.0000D
White Corona	1273.8AB	552.42A	13.810B
<i>LSD</i>	3668.4	92.242	2.3061

Means followed by the same letter are not statistically different at the 5 percent level, by the Duncan multiple range test.

Single plant weight (g)

For single plant weight significant differences were found (Table 2). Maximum weight was recorded in First Early (3773) closely followed by TSX- C37 F1 (1747.7), Taxila (Local) (1415.7) and Second early (1221.2). Results are in line with the findings of Wambani *et al.* (2007), El-Rehim (2003), Ledo *et al.* (2000) and Cardoso (1999).

Single curd weight (g)

Maximum values (710.67) for curd weight was observed in genotype TSX- C37 F1 followed by White Corona (552.42) and Taxila (Local) (513.17). Differences among genotypes were also reported by many workers (Wambani *et al.* (2007), Naveen and Tarsem (2005), El-Rehim (2003), Batra and Singh (2000), Ledo *et al.* (2000) and Cardoso (1999).

Total Yield Curd weight basis (t/ha)

For total yield of cauliflower significant differences were observed among all genotypes (Table 2). Maximum yield was recorded in genotype TSX-C37 F1 (17.767) followed by Taxila (Local) (12.829) and White Corona (13.810). Similarly many studies showed genetic variability in Cole crops (Wambani *et al.* (2007), Naveen and Tarsem (2005), El-Rehim (2003) and Batra and Singh (2000).

CONCLUSION

Genotype TSX- C37 (F1) proved best among all genotypes in term of yield during summer season (Early season) followed by Taxila (Local) and White Corona. Although First early, Second early and Taxila (Local) showed greater growth capabilities. However, higher growth (Height and Spread) is not necessarily a useful criterion for higher yields. This may be because; the genotypes having higher growth partitioned relatively greater portion of assimilate into leaves at the expense of crud production.

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