Pak. J. Agri. Sci.
25(1,65, 1988.

STUDIES ON PRODUCTION OF TOMATO CULTIVARS IN SUMMER SEASON

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Seven cultivars of tomato were evaluated on the bases of days taken to flowering, fruit setting and maturity period, number and weight of fruit per plant, average fruit weight, plant height and yield. The cultivars 'Roforto', 'Roma V.F.' 'Faisalabad Selection', 'Napoli' and PARC-HT-II matureb earlier whereas 'Calace' was late maturing variety. The cultivar 'Faisalabad Selection 1' produced maximum number of fruits per plant and gave the highest yield of 31.5 t/ha followed by 'Roma VF' with 33.73 t/ha yield.

INTRODUCTION

Tomato (*Lycopersicon esculentum* Mill.) is an important vegetable crop of Pakistan. However, the presently cultivated varieties are very much sensitive to hot climate and due to seasonal variations in Pakistan their production and supply is limited almost to early summer. One of the limiting factors for the success of tomato crop is high temperature during summer season.

In tropical and sub-tropical areas of the world the change of temparature during tomato cropping is often gradual. Environmental temperature extremes coinciding with critical stage of plant development often cause a major threat to crop productivity under field conditions. It is fairly well known that temperature has a marked effect on fruit setting in tomato. Fruit set is usually poor when the temperature is either relatively low or relatively high. Moore and Thomas (1952) found that when the average maximum day temperature was above 90°F fruit set was low. Ivakin (1977) reported that tomato varieties differed in resistance to heat and drought; the cultivar 'Avalanche' was found to be fairly tolerant to high temperature (Nandpuri et al, 1975).

There also exists a lot of variation in tomato varieties for different plant

characters like height, maturity, fruit shape, weight, yield, colour and quality of fruit. Gabal *et al.* (1985) in a trial to evaluate some cultivars of tomato observed that varieties 'VFN Bush' and Strain B' had slightly oblong fleshy fruits and mean fruit weight varied considerably from 66.6 g in 'Strain B' to 99.7 g in 'VFN Bush.. They further reported that mean total yields for 'VFN Bush', 'Strain B', 'Yates' and 'Marmande' were 56.0, 36.2, 31.5 and 29.7 t/ha, respectively. Ermolova (1984) observed that variety 'Progressivnyi' gave average yield of 57.5 t/ha with mean fruit weight 75 g and attained 45 cm plant height at final harvest. Ermolova and Kasymov (1982) observed that 'Oktyabr' a mid late variety of tomato attained a height of 65-70 cm and produced fruit with average weight ranging from 300-400 g. As reported by Horie (1985), the cultivar 'Kagyoku' produced smaller fruit (180g) than 'Ryugyoku' (210 g). The average fruit weight of variety 'Danna' ranged from 116-120 g (Glavinich *et al.*, 1982). The present study was designed to make a comparative study of local as well as exotic cultivars of tomatoes for screening high yielding varieties suitable to our agro-climatic conditions.

MATERIALS AND METHODS

Six exotic varieties of tomato with one local check were evaluated in a Randomized Complete Block Design with four replications at National Agricultural Research Centre, Islamabad during Kharif 1985. Nursery was raised during the last week of January, 1985 by adopting normally used cultural practices. Forty-day old seedlings were transplanted during the first week of March, 1985. Each plot comprised three rows, 6m long. The distance between rows and plants was kept 75 cm and 50 cm, respectively. The monthly mean maximum and minimum daily air temperatures ranged between 27° to 39° C and 10° to 22°C, respectively, during the cropping season.

Data were recorded on days to flowering, days to fruit setting, maturity, plant height, total number of fruit per plant, total fruit weight per plant, average weight of single fruit and yield per hectare.

The data were analysed by the analysis of variance and the test of significance was applied following Duncan's Multiple Range Test.

Table 1. *Meteorological data for the experimental station during 1995.*

Month	Average rain fall (mm)	%Relative humidity	Air temperature (°C) Mean maximum	Mean minimum	Sun shine (Hours)
March	1.21	42	27	10	6.67
April	1.1	51	30	16	7.00
May	1.0	37	36	18	10.30
June	0.5	36	39	22	10.40

RESULTS AND DISCUSSION

The data indicated that the variety 'Calace' took the maximum time of 31.25 days to bloom after transplanting followed by 'Roforto' which took 20.75 days whereas other varieties took the minimum time of 17.25 days to bloom (Table 2). It may be attributed to genentic and climatic factors. The differences of means were highly significant for cultivars.

The fruit setting was proportionately more quick in early flowering varieties. The maximum time taken to set fruit was by 'Calace' which was 41 days followed by 'Roforto' which took 28 days for fruit setting. The minimum time taken by all other cultivars was 25.25 days (Table 2). Similarly, early flowering cultivars were proportionately quick maturing. The maximum time to mature was taken by 'Calace' which was 62.75 days followed by 'Roforto' which took 58.75 days for the first fruit to mature. 'Roma VF' and 'PARC-HT-II' took time of 55.00 days to attain maturity of first fruit. Difference between the earliest and the latest maturing cultivars was 7.75 days. It may also be attributed to genetic and climatic factors.

Maximum plant height (103.40 cm) was found in 'Marmande' and minimum plant height (81.85 cm) was observed in 'PARC-HT-II' (Table 2). Other cultivars were in between these limits. Ermolova and Kasymov (1982) reported plant height ranging from 65-70 cm in the cultivar 'Oktyabr'. The variation in the plannt height of the varieties used may by attributed to their variable genetic make up and response to environmental condition.

Cultivar 'Faisalabad Selection I' producted the maximum number of fruits per plant (30.50) followed by 'PARC-HT-II' (30.10), while 'Calace' produced

The minimum number of fruits per plant (5.80) (Table 3). The differences in means were highly significant for cultivars. The high temperature which exceeded 35°C during the months of May and June resulted in poor fruit set in 'Marmande' and 'Calace'. The average maximum atmospheric temperature during the first and the last picking of mature fruit in all the cultivars ranged between 36° and 39°C. The present results support Moore and Thomas (1952). The maximum average number of fruits per plant was observed in the cultivar 'Faisalabad Selection 1' followed by 'PARC-HT-II'. This was clear that these cultivars/lines having passed through the period of high temperature are tolerant to high temperature stress. Similar results have been reported by Ivakin (1977) who found that tomato varieties differed in resistance to heat and drought.

Table 2. *Plant characters of different tomato cultivars.*

Cultivars/ Lines	Number of days to flowering.	Number of days to fruit set	Fruit maturity (days)	Fruit height of plant (cm)
'Roma V. F'	17.25 c	25.25 c	55.00 c	85.55 bc
'Faisalabad Sel. 1.'	17.25 c	25.25 c	56.75 c	96 35 ab
'Napoli'	17.25 c	25.25 c	56.80 c	97.80 ab
'Rofort.'	20.75 b	28 00 b	68.75 b	96 90 ab
'Marmande'	17.25 c	25.25 c	56.50 c	103.40 a
'PARC-HT-II'	17.25 c	25.25 c	55 00 c	81.85 c
Calace'	31.25 a	41 00 a	62.75 a	88.70 bc

Means not followed by same litters differ significantly at one percent lelve of prodadility by Duncan' s Multiple Range Test.

As shown in Table 3 the cultiver 'Calace' produced the maximum weight of single fruit (146 93g) whereas minimum weight was recorded in 'PARC-HT-II' (25.74 g). Other cultivars were in between these limits. Variation in fruit weight by different cultivers have also been reported by Gabal *et al.* (1985), Ermolova (1984), Horie (1985) and Galavinich *et al.* (1982).

The cultivars which had the maximum fruit weight per plant produced the highest yield per hectars (Table 3). Maximum fruit weight per plant (1229 8 g) was recorded in the cultivar 'Faisalabad Sel.1' which resulted in the highest yield (35.8 t/ha) followed by 'Roma V. F' (33.7 t/ha). These these two cultivars gave significantly higher yield than the rest of the cultivars.

Table 3 *Fruit yeild of different tomato cultivars.*

Cultivars/ Lines	Number of fruit per plant.	Weight of single fruit (gm)	Weight of fruit per plant (gm)	Average yield (t/ha)
'Roma V. F'	22.80 b	51.34 c	1168 a	33.73 a
'Faisalabad Sel.1'	30.50 a	40.33 d	1230 a	33.51 a
'Napoli'	18.25 c	40.25 d	734 c	21.18 c
'Roforto'	25.25 b	36.07 d	910 b	26.26 b
'Marmande'	9.05 d	94.38 b	854 c	24.65 b
'PARC-HT-II'	30 10 a	25.74 e	774 c	22.36 c
'Calace'	5.80 e	146.93 a	852 bc	24.61 bc

Means not followed by same letters differ significantly at one percent level of probablity by Duncan' s Multiple Range Test.

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