



## EVALUATION OF VARIOUS TOMATO (*Lycopersicon esculentum* Mill.) CULTIVARS FOR QUALITY, YIELD AND YIELD COMPONENTS UNDER AGRO CLIMATIC CONDITION OF PESHAWAR

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### ABSTRACT

Investigation were undertaken to study “Evaluation of various cultivars for quality and yield of tomato (*Lycopersicon esculentum* Mill.) under agro climatic condition of Peshawar” an experiment was conducted at Agriculture Research Institute Tarnab (ARI) Peshawar during 2013-14. The experiment was laid out in Randomized Complete Block Design (RCBD) with having three replications. Roma, Money Maker, Super Stone, Super Classic and Bambino cultivars of tomato was evaluated during experiment. The parameters selected under study i.e. Plant height (cm), number of branches plant<sup>-1</sup>, average fruits weight (g), number of fruits plant<sup>-1</sup>, yield (t/ha), TSS, Ascorbic Acid (mg/100g) and Acidity (%). All the parameters were found significantly different among various cultivars. The results shows that maximum plant height (137.37 cm), number of branches plant<sup>-1</sup> (4.71) and number of fruits plant<sup>-1</sup> (137.47) was recorded in Cv. Money Maker, whereas maximum average fruit weight (80.78g), Ascorbic Acid (16.53mg/100g) and yield (23.31 T ha<sup>-1</sup>) was noted in Cv. Roma. The result shows that among all qualitative parameters Roma cultivars was found superior. So it is concluded from this study that Cv. Roma produced maximum yield among all cultivars and it is most suitable for the agro climatic condition of Peshawar.

**Keywords:** tomato, cultivars of tomato, quality and yield.

### INTRODUCTION

Tomato (*Lycopersicon esculentum* Mill.) is one of the most important vegetable worldwide. Worldwide tomato produced about 150 million tones every year (anonymous, 2011). Tomato is annually crop and produce high yield and it is most economic crop. The use of tomato increasing day by day and the area under cultivation is increasing daily all over the world. It consist large amount of minerals, ascorbic acid, sugars and dietary fibers. Iqbal *et al.*, 2011 reported that tomato contain vitamin C and B, Fe, lycopene and P. Ketchup, juices, purees, canned and dried tomato are most economical processed products of tomato.

Tomato plant do not resistant to drought and its economical yield decline considerably after short period of water deficiency. It is important to water the plants regularly, especially during flowering and fruit formation. The amount of water that is needed depends on the type of soil and on the weather (amount of rain, humidity and temperature). Tomatoes are produce in spring and autumn seasons in Pakistan (Naz *et al.*, 2012). The yield potential and quality of tomato can be improved by proper fertilizer application and by the use of new cultivars (Ali *et al.*, 2015). Tomato required warm condition and abundant sunshine for proper growth and development. Vegetative and reproductive growth of tomato are less in low temperature and some time it extend their growth or cause chilling injury (Regassa *et al.*, 2012). Quality, shape, size, firmness, yield and all other characteristics are varied in tomato varieties (Suwwan and Abu-Baker, 1986; Georgiev *et al.*, 1988; Chaudhary *et al.*, 1999). Tomato varieties ‘VFN Bush’ and ‘Shain’ had slightly oblong fleshy fruits with maximum fruit weight in all the entries tested for growth and yield (Gabal *et al.*, 1985). Khokaret *et al.*, (1988)

observed difference in fruit maturation, plant height, fruits plant<sup>-1</sup>, fruit weight and yield. Hussain *et al.*, (2001) reported that Cv. Ermolova had wide range of adaptation and Cv. Tanja has ability to produce maximum average fruit weight and give highest yield. The current study was therefore initiated to find out the most suitable cultivars for agro climatic condition of Peshawar

### MATERIALS AND METHODS

The experiment “Evaluation of various tomato cultivars for quality and yield under agro climatic condition of Peshawar” was conducted at Agricultural Research Institute (ARI) Tarnab Peshawar KPK Pakistan during 2013. The experiment was laid out Randomized Complete Block Design (RCBD) with three replications. There were five tomato cultivars i.e. Roma, Money Maker, Super Stone, Super Classic and Bambino. The seedling was selected form Agricultural Research Institute Tarnab. Plant to plant distance were 60 × 60cm and row to row distance kept 90 × 90cm. The seedlings were transplanted to well-prepared field in March 2013. All cultural practices i.e. irrigation, hoeing and weeding, and fertilizer applications keep same for all cultivars.

### DATA COLLECTION

The following parameters were studied:

#### Plant height (cm)

The plant height was measured of five random randomly selected plants from soil surface to the top point of the plant with help of measuring tape.

**Number of branches plant<sup>-1</sup>**

Number of braches plant<sup>-1</sup>were counted in five randomly selected plants and then calculate average.

**Number of fruits plant<sup>-1</sup>**

At the time of each picking fruits were counted in each cultivar of tags plants.

**Average fruits weight (g)**

In each cultivars five tomato fruits was measured with the help of electric balance and the calculate average.

**Yield (T ha<sup>-1</sup>)**

Yield of tomato fruits in tons was calculated through the following formula

$$\text{Yield (T ha}^{-1}\text{)} = \frac{\text{yield per plot (kg)} \times 10,000}{\text{Plot area (m}^2\text{)} \times 1,000}$$

**Total soluble solids (°Brix)**

Total Soluble Solids was measured with the help of refractometer of three samples of all treatments and cultivars of tomato.

**Ascorbic Acid (mg/100g)**

Ascorbic acid content in tomato fruits was determined by standard method as reported in AOAC, (1998).

**Acidity (%)**

Acidity in tomato fruits was determined by the method of AOAC, (1998).

**STATISTICAL ANALYSIS**

The data recorded on various parameters were subjected to the analysis of variance (ANOVA) technique (ANOVA) to find out the difference between different cultivars. In cases where differences were found significant, means were compared for differences using least significant difference (LSD) test. Statistical computer software (Statistix 8.1) was applied for computing both the ANOVA and LSD. All the assumptions were checked to ensure the statistical validity of analysis.

**RESULTS AND DISCUSSIONS****Plant height (cm)**

According to data shown in Table-1, plant height was significantly different among the cultivars, whereas

maximum plant height 137.37 cm was noted in Cv. Money maker. While minimum plant height 76.42cm was recorded in Cv. Roma. The results are in agreement with Rab and Ihsan, (2008) who reported same result on application of Nitrogen. Naz *et al.*, 2011 reported variation with in cultivars because of genetic makeup and different requirements of environmental condition.

**Number of branches plant<sup>-1</sup>**

Table-1 also indicates the number of branches plant<sup>-1</sup>, which is found highly significant, in which maximum number of branches plant<sup>-1</sup> (4.71) was noted in Cv. Money Maker. Whereas minimum number of branches plant<sup>-1</sup>(3.29) was recorded in Cv. Bambino. The results are in line with Iqbal *et al.*, (2011). Davis *et al.*, 2003 reported that number of branches are varied in different cultivars due there genetic makeup.

**Number of fruits plant<sup>-1</sup>**

Maximum number of fruits plants (137.47) was found in Cv. Money Maker statistically different from the following Cv. Roma (83.98) and Cv. Super Classic (82.12). On other hand Cv. Bambino and Cv. Super Stone have lowest number of fruits plant<sup>-1</sup> of 78.90 and 79.49 respectively (Table-1). The results are in line with Ali *et al.*, 2013.

**Average fruit weight (G)**

Table-1 shows the data regarding to average fruit weight (g), which was observed highly significant. The maximum average fruit weight (80.78g) was noted in Cv. Roma followed Cv. Bambino having 79.05g fruit weight. Whereas lowest average fruit weight 65.70g was noted in Cv. Money Maker. The findings are in agreement with Iqbal *et al.*, 2011.

**Yield (T ha<sup>-1</sup>)**

Table-1 also provide the yield (T ha<sup>-1</sup>), which was found significantly different as well. The results indicate that maximum yield (23.31T ha<sup>-1</sup>) was observed in Cv. Roma, whereas minimum yield (17.98T ha<sup>-1</sup>) was reported in Cv. Money Maker. The findings are in line with Rab and Ihsan, (2008). The variation in total yield of tomato is might be due the variation in the genetic makeup of different cultivars. It is also the possible reason for variation in yield each cultivars required different environmental conation for proper growth and development to produce optimum yield (Davis *et al.*, 2003).

**Table-1.** Mean data regarding plant height (cm), Number of branches plant<sup>-1</sup>, Number of fruits plant<sup>-1</sup>, Average fruit weight (g) and Yield (T ha<sup>-1</sup>).

S. No.	Plant height (cm)	Number of branches plant <sup>-1</sup>	Number of fruits plant <sup>-1</sup>	Average fruit weight (g)	Yield (T ha <sup>-1</sup> )
Roma	76.42b	3.42cd	83.98b	80.78a	23.31a
Money Maker	137.37a	4.71a	137.47a	65.70b	17.98c
Super Stone	77.44b	3.64b	79.49cd	77.23a	19.76c
Super Classic	77.30b	3.49c	82.12bc	78.86a	19.33b
Bambino	77.16b	3.29d	78.90d	79.05a	20.32b
LSD	3.61	0.15	3.17	4.82	1.16

**Total soluble solids (<sup>o</sup>Brix)**

Total soluble solids were found significantly different among the various cultivars of tomato (Table-2). The result shows that maximum (4.98) TSS was reported in Cv. Bambino followed by Cv. Super Stone having (4.83) TSS whereas minimum (3.70) TSS was recorded in Cv. Money Maker significantly followed by Cv. Roma having (3.90) TSS. The results are in line with Javeria *et al.* (2012). Yagmur *et al.* (2004) also reported variation in TSS on the application of different level of K.

**Ascorbic acid (mg/100g)**

The statistical analysis shows that Ascorbic Acid content in tomato fruit varied significantly among the cultivars of tomato. (Table-2). Mean data of tomato cultivars shows that maximum Ascorbic Acid (16.53 mg/100g) content in tomato fruit was recorded in Cv. Roma followed by Cv. Super Classic having (16.27

mg/100g) Ascorbic Acid and lowest Ascorbic Acid (13.70 mg/100g) was noted in Cv. Super Stone followed by (14.54 mg/100g) Ascorbic Acid was reported in Cv. Bambino. Similar results have been also reported by Singh and Tawari, (2013). Chatterjee *et al.* (2003) confirmed that Zinc increased the Ascorbic Acid content in tomato fruit. Peyvast *et al.* (2009) reported that potash level also effect Ascorbic Acid in tomato fruits.

**Acidity (%)**

Analysis of the data reflects that there insignificant variation in tomato cultivars (Table-2). The results shows that maximum (0.40%) Acidity was found in Cv. Super Classic followed by Cv. Super Stone and Money Maker having (0.38%). Whereas minimum (0.35%) Acidity was perceived in Cv. Bambino followed by Cv. Roma having (0.36%). The results are in agreement with Javaria *et al.* (2012).

**Table-2.** Mean data regarding TSS, ascorbic acid and acidity.

S. No.	TSS ( <sup>o</sup> Brix)	Ascorbic acid (mg/100g)	Acidity (%)
Roma	3.90c	16.53a	0.36c
Money Maker	3.70d	15.34b	0.38b
Super Stone	4.83a	13.70d	0.38b
Super Classic	4.17b	16.27a	0.40a
Bambino	4.98a	14.54c	0.35c
LSD	0.91	0.35	0.10

**CONCLUSIONS AND RECOMMENDATION**

It is concluded from this study that Cv. Roma is the most suitable cultivar in terms of yield and yield components. This study also suggests that Cv. Roma cultivar may be considered as candidate variety for feature commercial cultivation.

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