

Testing the Performance of Fig (*Ficus carica*) Cultivars Planted in High Density System under Agro-Climatic Condition of Islamabad

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Abstract

Fig (*Ficus carica*) is one of the famous fruit species in world wide. The present study was undertaken to investigate “the performance of fig cultivars (Local, Brown Turkey and Black Mission) planted in high density system under agro-climatic conditions of Islamabad”, at the experimental farm of National Agriculture Research Centre (NARC) Islamabad. Production and quality data were recorded for the evaluation of these cultivars. Five parameter (number of fruits, weight, size (volume), TSS, and yield plant⁻¹) with three replications and five plants replication⁻¹ for each cultivars were studied during the experiment and after harvesting. The experiment was laid out in Randomized Complete Block Design (RCBD). It was observed that number of fruits plant⁻¹ indicated a significant difference among cultivars. Highest number of fruits plant⁻¹ were observed in Brown Turkey (12.48) followed by Black Mission, while lowest number of fruits plant⁻¹ (10.38) was noted in local cultivar. Maximum fruit weight (25.77 g) was recorded in Local selection while lowest fruit weight (20.39 g) was found in Brown Turkey cultivar. Fruit volume, and maximum fruit size was observed in Brown Turkey (22 ml) followed by Black Mission having (19.33 ml). Maximum TSS of fruits was observed in Black Mission (12.49) while minimum TSS (11.03) of fruits was recorded in Brown Turkey. The maximum yield plant⁻¹ was recorded in local selection (265.43 g) followed by Black Mission having (256.2 g) plant⁻¹. The result of this study suggested that brown turkey followed by local selection was found the best in relation to growth and yield of fig tree in Agro-climatic condition of Islamabad.

Keywords: Fig, Fruit weight, Number of fruits, Fruit size, Total soluble solids (TSS).

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INTRODUCTION

Fig (*Ficus carica* L.) a deciduous fruit tree belongs to family Moraceae, and prized as one of the classical fruits sought out by ancient civilizations. Today, fig is an important crop worldwide for both dry and fresh consumption. Cultivars of fig are propagated by cuttings, grafting, layering and micro-propagation. However, seeds are used mainly for breeding purposes [1], while some cultivars produce non-viable seeds. Moreover, propagation by cuttings give low rooting percentage and only 20 to 30 % of the cuttings get survive [2]. Fig tree is native to temperate regions of Asia Minor or Turkey, and today, grown as an important fruit of commerce in the Eastern Mediterranean climates, USA, and Spain. Throughout history, figs have been grown and prized as one of the classical fruits sought out by ancient civilizations. It is

believed that figs are native to western Asia and were spread throughout the Mediterranean by man. Figs were brought to California from Spain in the mid eighteenth century and nowadays they were spread to warmer growing regions east of the Rocky Mountains. They are generally limited in cultivation to areas where winter minimum temperatures do not go below 5°F, although stem tissue can be injured at temperatures well above that. In winters with sustained cold, mature trees can survive temperatures in the low teens but trees can sustain severe damage during dry winters or if plants are not properly acclimated [1]. During each season, fig bears several hundreds of pear-shaped fruits and gives fruit twice a year, which vary in size and colour depending on the variety. Interiorly, fig fruit features numerous, tiny club shaped ovaries extending towards central hollow cavity. In their natural habitat, “Capri

figs" pollinated by tiny "gall wasp" insect that enters flower clusters through a small opening at the apex [3].

The health benefits of figs include its use as a treatment for sexual dysfunction, constipation, indigestion, piles, diabetes, cough, bronchitis and asthma. It is also used as a quick and healthy way to gain weight back after suffering through an illness. The health benefits of figs come from the presence of minerals, vitamins and fibers contained in the fruit. Figs contain a wealth of beneficial nutrients, including vitamin A, vitamin B₁, vitamin B₂, calcium, iron, phosphorus, manganese, sodium, potassium and chlorine. Fig are high in dietary fibre having magnesium and potassium, it's relatively rich in Vitamin A, B and C and poor in calories, 50 calories each. Using fig frequently avoid diseases. According to Agricultural Statistics, area under cultivation of fruits in Pakistan is about 162 ha. Out of which we are getting 741 tons of fresh fruits annually. The average production is about 8.23 t ha⁻¹, which is least in quantity as compared to advanced countries, i.e. 20-25 t ha⁻¹ [4]. There are so many reasons for low production therefore it needs to increase the productivity in order to meet the requirements of increasing population and exports as well. To increase the production we have either to increase the area under fruit cultivation or to go for modern orchard establishment i.e. high-density plantings and best management practices. Control of excessive vegetative growth in a tree for increased productivity is major principle of high-density orchard [5].

Several cultivars of fig exist; some of the popular varieties commonly grown in the USA are Brown Turkey, Conadria, Kadota, and Black mission. However, since the wasp does not exist in the North America, most of these fruits develop by parthenogenesis (without pollination) and therefore, do not possess true seeds [6]. For spring propagation, before the tree starts growth, cut 15–25 cm (6-10 inches) shoots that have healthy buds at their ends, and set into a moist perlite or sandy soil mix located in the shade. Once the cuttings start to produce leaves, bury them up to the bottom leaf to give the plant a good start in the desired location. Plants in the field may be spaced from 6 to 25 ft (1.8-7.5 m) apart depending on the cultivar and the fertility of the soil. A spacing of 13 x 13 ft (4x4 m) allows 260 trees acre⁻¹ (625 trees ha⁻¹). In Colombia, growers are advised to set the trees at 10 x

10 ft (3x3 m) on level land, 10 x 13 ft (3x4 m) on slopes. So the present study was planned to check the performance of fig fruit cultivars under different agro-climatic conditions of the region.

MATERIALS AND METHODS

An experiment was conducted at Fruit Program, Horticultural Research Institute (HRI), National Agricultural Research Centre (NARC) Islamabad in 2015.

Experimental Procedure

Three fig cultivars (Local, Brown Turkey, and Black Mission) were used in the experiment which was planted in high density planting system. Production and quality data were recorded for evaluation of these cultivars. Five parameters (number of fruits, fruit weight, fruit volume, TSS and yield plant⁻¹), with 3 replications and five plants per replication for each cultivars were studied during the experiment and after harvesting. Number of fruit were count visually; fruit weight was recorded by using weight balance; Size of the fruit was recorded by using the beaker and they were measured through volume. Similarly the TSS of the fruit was observed by using the refractive meter and yield plant⁻¹ was also calculated.

Statistical Analysis

The data were statistically analysed by using Randomized Complete Block Design (RCBD) and means were compared by using Least Significant Difference (LSD) test [7].

RESULTS AND DISSCUSSION

Our results showed that the observed parameters have significant differences of various fig cultivars.

The results for number of fruits plant⁻¹ indicated a significant difference among cultivars. Highest number of fruits plant⁻¹ were observed in Brown Turkey (12.48) followed by Black Mission while lowest number of fruits plant⁻¹ (10.38) was observed in local cultivar as shown in Table 1 and graphically shown in fig-1. The above results are closely resembled with the findings of [8] and [9], where they stated that different cultivars of fig were cultivated and observed the significant differences between them.



Pictures taken while collecting weighing and finding the TSS of pig cultivars

Results of fruit weight in current experiment showed significant difference among the cultivars. Maximum fruit weight (25.77 g) was recorded in Local selection while lowest fruit weight (20.39 g) was found

in Brown Turkey cultivar as shown in Table-1 and graphically shown in fig-1. Our results show comparison with the findings of [10], and [11], who got maximum fruit weight from different cultivars of fig.



Data in Table-1 and graphically shown in fig-1 showed that the fruit volume, and maximum fruit size was observed in Brown Turkey (22 ml) followed by Black Mission having (19.33 ml) while minimum fruit size (17.33 ml) was observed in Local cultivar. Our results are in corresponding of [12] and [5] results, in which then got maximum size of fig fruits from different cultivated cultivars.

Total soluble solid (TSS) are important for measuring of sugar contents with in the fruits. This showed significant difference among different cultivars. Maximum TSS of fruits was observed in Black Mission (12.49) while minimum TSS (11.03) fruits was observed in Brown Turkey as shown in Table 1 and graphically shown in fig-1. Our findings are in match with the results of [13] and [14] who got maximum total soluble solid from different cultivars of fig.



Slices of fig varieties (Black mission and Brown Turkey)

Yield is important parameter for the selection of cultivars. The maximum yield plant^{-1} was recorded in local selection 265.43 g plant^{-1} followed by Black Mission having 256.2 g plant^{-1} whereas Brown Turkey

had lowest yield 254.47 g plant^{-1} . Our result showed similarity with findings of [10], and [15] who observed sufficient yield plant^{-1} from different cultivated varieties of fig.

Table-1: Mean data collected on different parameters of different fig cultivars

Cultivars	Number of fruits plant^{-1}	Fruit weight	Fruit volume	TSS
Brown Turkey	12.48 a	20.39 a	22.00 a	11.03 a
Black Mission	12.12 a	21.14 a	19.33 a	12.49 a
Local	10.38 a	25.77 a	17.33 a	11.57 a
LSD Value	3.8856	7.613	7.4423	2.2375

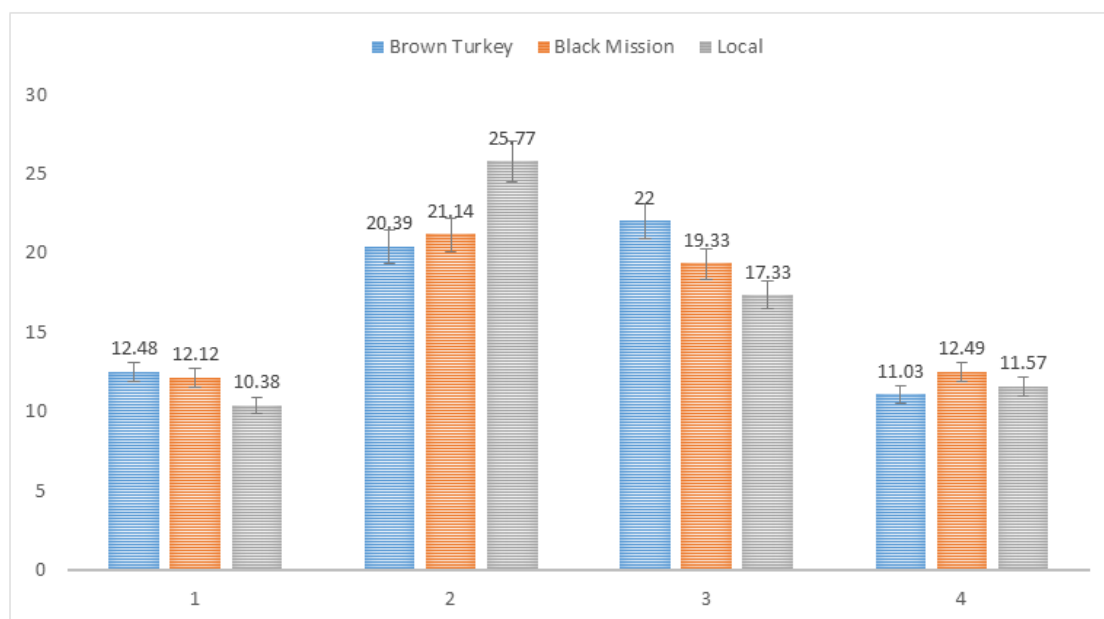


Fig-1: Graphically shown mean data collected on different parameters of different fig cultivars

CONCLUSION

An experiment which is based on the topic “Testing the performance of fig cultivars planted in high density system under Agro-climatic condition Islamabad” a significant data was observed among three different cultivars. Maximum fruit size was observed in Brown Turkey (22 ml), Black Mission (19.33 ml) while minimum fruit size (17.33 ml) was observed in Local cultivar. Maximum TSS was observed in Black Mission (12.49), followed by Local variety (11.57) while lowest TSS (11.03) was observed in Brown Turkey. Maximum average fruit weight of (25.77 g) was found in Local followed by Black Mission (21.14 g) while lowest fruit weight (20.39 g) was found in Brown Turkey. The higher numbers of fruits plant⁻¹ were observed in Brown Turkey (12.48) as compared to Black Mission (12.12) and local selection (10.38). The preliminary result showed that Brown Turkey and Black Mission performed well in high density system as compared to Local cultivar.

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