

# Evaluation of Physiological Characteristics of Different Peach Varieties Under the Agro-Climatic Condition of Buner at Agriculture Research Station, Buner



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## Abstract

The research on the "Evaluation of physiological characteristics of different peach varieties under the agro climatic condition of Buner" was carried out at Agriculture Research Station (ARS), Buner during 2017. Three varieties i.e. TexasY-455, Golden, and Coronet were tested for physiological attributes. The results were compared. The mean maximum number of fruit shoot<sup>-1</sup> (4.77), number of fruit plant<sup>-1</sup> (232.66), fruit flesh weight (121.6g), stone weight (6.8g) were recorded for variety TexasY-455, while the mean minimum fruit shoot<sup>-1</sup> (2.6), fruit flesh weight (81.8g), stone weight (4.2g) were recorded for variety Coronet. The variety Coronet shows poor results among Texas-455, Golden and Coronet in the study attributes. On the basis of results, it is concluded that peach variety TexasY-455 could be recommended for farmer community in District Buner because it shows best performance as compared to other peach varieties.

**Keywords:** Physiological Characteristics; Peach; Prunus Persica; Varieties

## Introduction

Botanically Peach is known as *Prunus persica* L. which belongs to the Rosaceae family. The Rosaceae family consist of 100 genera and 3000 species (Hickey and King [1]). Peach is originated in China. Peach is very popular fruit grown in Khyber Pukhtunkhwa (Muhammad [2]). Peach is the 2<sup>nd</sup> most important fruit after plum in Pakistan. China is the largest producer of the Peach. Peach is widely grown in the Swat District (Khan [3]) Peach is relatively short lived perennial woody deciduous tree of small to medium size which is 4-10m tall. Its leaves are broadly lanceolate and coarsely serrated. Peach tree trained into open center system. Flowers are located laterally in leaf axils. All commercial peach cultivars are self-pollinated. Its fruit is drupe which encloses a stony endocarp. The fruit is either rounded or elongated having pleasant flavor and attractive colors. Peach occupy the most important place in the stone fruits and is temperate in nature. By supplying peach fruit of high quality and grade, Swat and Peshawar valleys enjoy the central position in Khyber Pakhtunkhwa. (Jahan Zeb [4]) Peach has a chilling requirement of 200-1000 hours below 45°F, to break bud dormancy and is moderately winter hardy. Peach is

grown at lower latitude and is found commercially around the world between 24° and 45° latitude above and below equator and between 600-1500m elevation. (Rana and Sharma [5]). Peach is susceptible to diseases like shot hole, brown rot and leaf curl in warm humid areas, but it produces high quality fruit in warm climate. (Bregoli [6]; Torrigiani[7]). It may take bud injury, twig killing, collar injury and bark splitting on very low temperature. (Westwood [8]). Days required from flowering to maturity vary in different cultivars of peaches from 78 to 127 days. (Dhuria[9]; Chander and Khajuria[10]). It can be grown on a wide range of soil depending upon the rootstock used. On light sandy loam soil, it can be budded on wild peach rootstock. Plum rootstock is the most suitable for heavy and moist soil. (Mahmood [11]). Rich well-drained sandy loam soils are most desirable. Peach can be grown in soils with the pH range of 5.5-8 (Malik [11]) Peach is a rich source of carbohydrates, vitamin A, C and minerals. The balance of sugar, organic acids, phenolic compounds, carotenoids and volatile compounds results flavor and aroma (Torralles[12]). Its fruit is used as a dessert. Most of the fruits is consumed in fresh form but it can also be preserved

in cans and used in preparation of jams. The small undesirable, diseased branches cut in annual pruning are utilized as fire wood (Westwood [8]). Peach is propagated through seeds as well as by vegetative methods. Seeds are sown in November and when the seedling attained pencil thickness, these are budded in summer. Seed propagation is commonly used for growing rootstocks, while T-budding is the most successful method for producing peach scion cultivars. (Chandler [13]) In the year 2014-2015, Peach occupied 14,000 thousand ha area with the production of 66,000 thousand ton in Pakistan. While in Khyber Pakhtunkhwa it covers an area of 7.6 thousand ha with the total production of 48,000 tons (MNFSR, 2014-15) Buner Valley is considered the best for growing stone fruits. The minimum average temperature of this locality remains usually from 8 to -3°C. However, fluctuations in humidity may take place with rainfall. Frost also occurs in the month of December to February. On the other hand, the maximum temperature may exceed from 40-44°C in summer having a humidity range of 80-90% in July and August. The farmers in District Buner grow different varieties of peach and carry out all the cultural practices but they have no idea of right variety selection. Proper variety selection is very important, because of its resistance to different pests and diseases as well as its high yielding ability. So Therefore, the present study was designed to evaluate a best growing and high yielding peach variety for District Buner.

### Objectives

#### As Part of My B.Sc (Hons) Studies, I Have Set the Following Objectives

- a) To Study the physical characteristics of different Peach varieties Grown in Agriculture Research Station, Buner.
- b) To find out the best peach variety for Agro-climatic conditions of District Buner.

### Methods and Materials

The Experiment was laid out in Randomized Complete Block Design (RCBD) with one factor replicated three times. The seven-year-old orchard has been planted on square system. Plant to plant and row to row distance kept at 16x16 feet's. There were three plants in each replication of each Variety. The Evaluation study consisted of one factor, i.e. variety evaluation. The following varieties were studied:

V<sub>1</sub>: Texas-455

V<sub>2</sub>: Golden

V<sub>3</sub>: Coronet

### Parameters Studied

The following parameters were studied during the research study:

The number of fruits shoot<sup>-1</sup> and number of fruits plant<sup>-1</sup> were counted manually, while the fruit flesh weight and stone weight was measured with the help of digital balance in grams. All the fruits are collected randomly from each replication and then the mean was calculated. The data collected on various parameters was subjected to analysis of variance (ANOVA) to observe the difference between treatments. In case when the difference was significant, they were further assessed for difference through least significant differences (LSD) test. Statistics 8.1 software was applied for computing both ANOVA and LSD (Steels and Torre) at 5% level of probability.

### Results and Discussion

The research work on the "Evaluation of the physiological characteristics of peach (*Prunus persica*)" was carried out in the Agriculture Research Station, Buner at peach orchard during 2017. The data regarding parameters are discussed in the following paragraphs.

#### Number of Fruits Shoot<sup>-1</sup>

The data regarding the mean values for number of fruits shoot<sup>-1</sup> of different varieties of peach are given in Table 1, while the analysis of variance is given in Table 2. Significant variation was observed in number of fruits shoot<sup>-1</sup> of different varieties. The mean values revealed that more number of fruits shoot<sup>-1</sup> (4.77) was noted in variety Texas-455 followed by variety Golden (3.18), while the lowest number of fruits shoot<sup>-1</sup> (2.6) was recorded in Coronet variety which is statistically similar to variety Golden. The lowest number of fruits shoot<sup>-1</sup> was recorded might be due to the maximum fruit size and as well as might be due to the genetic makeup of the varieties. Similar results were reported by Richard P. Marini. He states that the minimum number of shoots/tree was 71 in "Norman" peach tree.

**Table 1:** Mean table for number of fruits shoot-1 for different varieties of Peach.

Variety	Replication			Mean
	R1	R2	R3	
Coronet	3.0	2.6	2.2	2.6b
Texas-455	4.99	4.66	4.66	4.77 a
Golden	3.44	3.66	2.44	3.18b

**Table 2:** Analysis of Variance for number of fruits shoot-1 for different varieties of Peach.

S.O.V	D.F	S.S	M.S	F.value	Prob
Rep	2	0.82460	0.41230		
Var	2	7.57340	3.78670	36.62	0.0027
Error	4	0.41360	0.10340		
Total	8	8.81160			

#### Number of Fruit Plant<sup>-1</sup>

The mean data regarding number of fruit plant<sup>-1</sup> are given in Table 3, while the analysis of variance is given in (Table 4)

Significant variation was observed in number of fruits plant<sup>-1</sup> of different varieties. The mean values revealed that maximum number of fruits plant<sup>-1</sup> (232.66) was noted in variety Texas-455, followed by Coronet (60.0) while the minimum number of fruits plant<sup>-1</sup> (50.66) was recorded in Golden which is statistically similar with variety Coronet. The fruits of Golden variety were of large size therefore number of fruits plant<sup>-1</sup> were less. Similar results were reported by Ali [14] He reported that the yield kg/tree of peach cultivar Florida King was (62.68).

**Table 3:** Mean table for number of fruit plant<sup>-1</sup> for different varieties of Peach.

Variety	Replication			Mean
	R1	R2	R3	
Coronet	108	41	31	60.0 b
Texas-455	288	106	304	232.66 a
Golden	77	55	20	50.66 b

**Table 4:** Analysis of Variance for number of fruit plant<sup>-1</sup> of different varieties of Peach.

S.O.V	D.F	S.S	M.S	F.value	Prob
Rep	2	12308.2	6154.1		
	2	63024.9	31512.4	7.40	0.0453
	4	17045.1	4261.3		
Total	8	92378.3			

### Fruit Flesh Weight (g)

It is clear from the (Table 5) that the mean values of higher fruit flesh weight (121.6g) was recorded in variety TexasY-455 followed by Golden (102.8g), while the lowest fruit flesh weight (81.8g) was recorded in variety Coronet. The analysis of variance is mention in Table 6. The higher fruit flesh weight is due to its genetic nature and also may be due to the more length and width of the fruit. Similar results were reported by Ayaz et al., (2001) they concluded that variety Coronet shows fruit flesh weight of (126g) at ARS Mingora Swat and fruit flesh weight of (75.5g) at GPU Biakan Swat.

**Table 5:** Mean table for Fruit Flesh Weight (g) for different varieties of Peach

Variety	Replication			Mean
	R1	R2	R3	
Coronet	76.1	83.2	86.3	81.8a
Texas-455	121.4	152.7	90.7	121.6a
Golden	105.3	102.7	100.5	102.8a

**Table 6:** Analysis of Variance for Fruit Flesh Weight (g) of different varieties of Peach.

S.O.V	D.F	S.S	M.S	F.value	Prob
Rep	2	628.33	314.16		
Var	2	2370.53	1185.26	3.49	0.1329
Error	4	1359.97	339.99		
Total	8	4358.82			

### Stone Weight (g)

Variation was observed in stone weight of different peach varieties. The mean Table7 shows that the mean maximum stone weight (6.8g) was noted in variety TexasY-455, followed by Golden variety (5.0g) while the mean minimum stone weight (4.2g) was recorded in variety Coronet. The mean table shows the significant difference in stone weight of different varieties of peach. The analysis of variance is given in Table8. The mean maximum stone weight might be due to its genetic nature and also might be due to the high fruit length and high fruit width. Similar results were reported by Ayaz [15] they noticed that variety Coronet shows stone weight of (6.0g) at ARS Mingora Swat and stone weight of (3.0g) at GPU Biakan Swat[16,17].

**Table 7:** Mean table for Stone Weight (g) for different varieties of Peach.

Variety	Replication			Mean
	R1	R2	R3	
Coronet	4.1	4.4	4.3	4.2b
Texas-455	6.2	8.0	6.4	6.8 a
Golden	5.4	5.0	4.8	5.0 b

**Table 8:** Analysis of Variance for Stone Weight (g) of different varieties of Peach.

S.O.V	D.F	S.S	M.S	F.value	Prob
Rep	2	0.7267	0.36333		
Var	2	10.6400	5.32000	14.64	0.0144
Error	4	1.4533	0.36333		
Total	8	12.8200			

### Summary

The research on the “Evaluation of physiological characteristics of different peach varieties under the agro climatic condition of Buner” was carried out at Agricultural Research Station (ARS), Buner during 2017. The experiment was laid out in Randomized Complete Block Design with three replications. Three varieties i.e. Coronet, TexasY-455 and Golden were studied. The data were collected on number of fruits shoot<sup>-1</sup>, number of fruits plant<sup>-1</sup>, fruit flesh weight (g), and stone weight (g). The parameters results are compared of different varieties. The mean maximum number of fruits shoot<sup>-1</sup> (4.77) was observed in TexasY-455 Variety, followed by variety Golden (3.18) while the mean minimum fruit shoot<sup>-1</sup> (2.6) was recorded for Variety Coronet. The mean maximum fruit plant<sup>-1</sup>(232.66) was noted for Variety TexasY-455, followed by variety Coronet (60) while the mean minimum fruit plant<sup>-1</sup>(50.66) was recorded for Variety Golden. The highest fruit flesh weight (121.6 g) was noted for Variety TexasY-455, followed by variety Golden (102.8) while the lowest fruit flesh weight (81.8g) was recorded for Variety Coronet. The highest stone weight (6.8g) was noted for Variety TexasY-455 followed by Golden Variety (5.0g), while the lowest stone weight (4.2g) was recorded for Variety Coronet.

The TexasY-455 was early mature variety which matures first among TexasY-455, Golden and Coronet.

## Conclusion

The results showed differences in the studied attributes of different peach varieties.

- a) The mean maximum fruit shoot<sup>-1</sup> (4.77), fruit plant<sup>-1</sup> (232.66), fruit flesh weight (121.6g) and the mean maximum stone weight (6.8 g) were recorded in variety TexasY-455. The variety coronet shows poor performance.

## Recommendation

On the basis of the above conclusions the variety TexasY-455 could be recommended for farmer community in District Buner as it shows best performance as compared to other varieties. Further research should be carried out to study the performance of other peach varieties.

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