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Research Article

Performance of Different Peach Varieties at Lower Altitude (4000 ft) of Murree Hills

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Abstract

Peach is unique stone fruit belongs to subtropical zones. It is getting high in demand due to its immense nutritional importance and dessert quality. High quality peach produce is dependent of various factors such as variety, rootstock, climate and soil etc. In pursuit of that the performance of eight different cherry varieties namely Florida King, Peach 8, Mario Delicizia, Peach 3, Early Grand, A-669, Nectarine and Spring Crest were evaluated in the climatic conditions of Tret (4000 ft). The experiment laid out according to randomized complete block design (RCBD), with four replications and one plant per treatment for the consecutive three years. Data regarding Flowering time , Fruit setting, Color break stage, Date of maturity, Ripening Stage , Fruit Weight (g), Fruit Length (cm), Fruit Width (cm), Yield per plant (kg), TSS % and Firmness. Peach 8 is the early maturity variety followed by Florida king. The Highest TSS value was shown by Florida King (13 ^{o}Brix) followed by Peach 8 (12 ^{o}Brix). Regarding the firmness (15) Florida king surpasses all other varieties. Regarding yield per plant Early Grand exhibited better results (15 kg/plant). In the long run, it will be an effective protocol for production of peach on commercial scale and development of market as well as storage on sound basis.

Keywords: Peach; Murree; Rootstock; Nutritional importance.

Introduction

Peach (Prunus persica L. Batsch) belongs to family Rosaceae and widely popular around the world owing to its high economic and nutritional value. The fruit is stone shaped and can be consumed fresh in addition to its suitability for processing industry. In the past few years it has attracted consumer attraction not only due to its sensory characteristics but also due to its health promoting properties and chemical composition (Chang *et al.*, 2016). According to Kader (1999) physical and biological characteristics combination determine the quality of fresh fruit. Fruit quality indicators comprise of physical appearance, sugar and acid contents however innumerable photo chemicals despite their low concentration determine fruit color and aroma Olsson *et al.* (2004). Sensory analysis also determines consumer perceives fruit's physicochemical attributes (Belisle *et al.*, 2017; Felts *et al.*, 2019).

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Peaches comprised of sugars, dietary fiber, vitamins and organic acids (Stanjanovi *et al.*, 2016). This rich chemical composition is associated with fundamental biochemical function in human body (Nowicka *et al.*, 2019). The dietary fiber in peach peel and pulp is valuable nutritious component (Yangilar , 2016) playing an important role in gastrointestinal health. In addition to that peaches comprises compounds showing antioxidant properties-ascorbic acid and carotenoids, (Tomás-Barberán *et al.*, 2001) flavonoids, phenolic acids, and anthocyanins (Noratto *et al.*, 2014; Wanpeng *et al.*, 2017; Manzoor *et al.*, 2012).

Peach fruit may be flat or round in shape and quality is highly dependent on season. Color, Shape, firmness and size are characteristics that need to meet certain quality standards at least at minimum level. Depending upon the pit attachment to flesh they can be classified as free stone, cling stone or semi free stone (Ramina *et al.*, 2008). Similarly flesh type can be classified as melting to non-melting which depends upon fruit enzymatic ability for pectin degradation during ripening (Tanou *et al.*, 2017).

Therefore the study was designed for evaluation of characteristics (color, firmness, shape, size, total soluble solids and firmness) of eight different types early and late ripening peach varieties to select the suitable characters for future breeding program.

Methodology

The study was carried out at Hill Fruit Research Substation Tret from 2012-16. The experiments comprised of eight peach varieties and data was taken regarding vegetative, flowering, yield and Post harvest parameters (Table 1). The data of the selected peach varieties was taken for the consecutive four years. Refractometer was used for measuring the Total soluble solids contents (TSS) and the value is expressed as ^{o}Brix. The experiment was done according to randomized complete block design (RCBD), with four replications and one plant per treatment. Analysis of variance technique was adopted at 5 % probability level for processing the data (Steel *et al.*, 1990).

Table 1: Varieties and parameters studied in the experiment.

Treatment	Name of variety	Parameters studied
V_1	Florida King	➢ Flowering time
V_2	Peach 8	➢ Fruit setting
V_3	Mario Delicizia	➢ Color break stage
V_4	Peach 3	➢ Date of maturity
V_5	Early Grand	➢ Ripening Stage
V_6	A-669	➢ Fruit Weight (g)
V_7	Nectarine	➢ Fruit Length (cm)
		➢ Fruit Width (cm)
		➢ Yield per plant (kg)
V_8	Spring crest	➢ TSS %
		➢ Firmness

Result and Discussion

The data revealed that the maximum weight of fruit (151 g) and maximum yield per plant (16) was recorded in V5 (Early Grand) and minimum (71 g) in (V7) Nectarine and minimum yield per plant (6 Kg/plant) in V6 (A669). V2 (Peach No.8) and V5 (Early Grand) were found to be the early varieties (Table 2). The maximum fruit firmness was found in Florida King (15) and minimum firmness (10) was found in Peach 8. Peach 8 and Early Grand found to be the early varieties of peach maturing in 7-12 May (Table 3).

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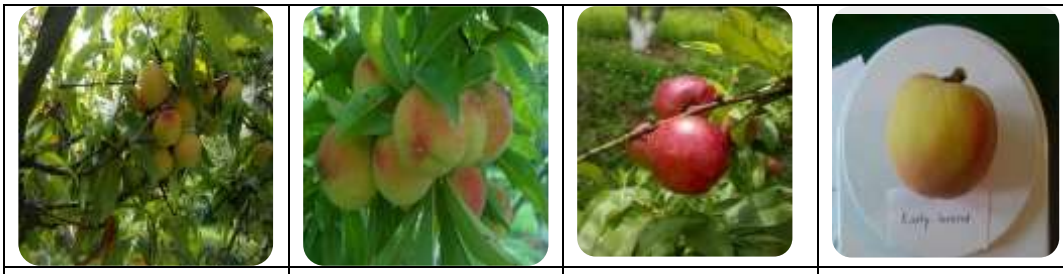

Florida king	Early Grand	Nectarine	Early Grand

Figure 1. pictorial view of peach fruit varieties.

Table 2: Vegetative and Flowering parameters of Peach Varieties.

Treatments	Flowering time	Petal Fall	Fruit setting	Color break	Maturity time	Ripening time
V1 Florida king	End Feb	End of Feb	Early Mar	Early Apr	Mid May	End May
V2 Peach No.8	Early Mar	End of March	Late Mar	Late Apr	Early May	End May
V3 Maria Delicizia	Mid Mar	Mid April	Early Apr	Late Apr	Mid May	End May
V4 Peach No.3	Early Mar	Start of April	Late Mar	Late Apr	Mid May	End May
V5 Early Grand	Early Feb	End of Feb	Late Feb	Late Mar	Mid May	End May
V6 A669	End Feb	Start of April	Late Mar	Late Apr	Late May	Early Jun
V7 Nectarine	End Feb	Mid April	Late Mar	Late Apr	Late May	End May
V8 Spring Crest	End Mar	Start of April	Late Mar	Late Apr	Late May	End May

Table 3: Harvest and Post Harvest parameters of Peach varieties.

Treatments	Fruit weight (g)	Fruit length (cm)	Fruit width (cm)	Yield / plant (Kg)	TSS (oBrix)	Firmness
V1 Florida king	112	5.1	5.0	14	13	15
V2 Peach No.8	72	3.9	4.0	8	12	10
V3 Maria Delicizia	125	5.3	5.1	8	10	12
V4 Peach No.3	115	5.5	5.4	9	10	12
V5 Early	151	4.4	4.6	16	13	12

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Grand						
V6 A669	84	3.7	3.9	6	10	11
V7 Nectarine	71	3.6	3.7	9	12	12
V8 Spring Crest	94	4.4	4.5	8	10	11

Bosa *et al.* (2016) observed that the fruit yield is dependent upon light interception and light use efficiency and its distribution in canopy determine the economic crop yield (Bosa *et al.*, 2016). Previous studies showed marked variations in peach physico-chemical characteristics which might be attributed to genetic variability and environmental effect (Chadha *et al.*, 1968), position of canopy , fruit maturity and crop load (Crisosto and Crisosto, 2005). In the present study all varities showed the TSS over 10 ^{o}Brix which according to Crisosto *et al.* (1997) is considered the minimum acceptable value for consumer acceptance for nectarines and peaches. The variation of TSS among varieties can be better explained through quantitative performance of quality trait (Quilot *et al.*, 2004). However varieties with TA lower than 0.9 % is minimum limit for low acidity peaches (Hilaire, 2003) because during maturity total soluble solids increases and acidity of fruit decreases during ripening stage (Padda *et al.*, 2011). In peaches ripening index serve as major organoleptic quality triat in case of mature fruit and used as index of quality (Bassi and Selli, 1990).

Conclusion

Maximum and highly significant heterosis and heterobeltiosis was found in cross NCEV-1530-11 × HNG (70.49 and 67.54), followed by HNG × EV-70040 (65.57 and 56.39) and HNG × NCEV-1530-11 (64.14 and 61.3), rest of the crosses also showed positive and highly significant heterosis and heterobeltiosis for grain yield per plant. According to General Combining Ability analysis NCEV-3 was identified as best combiner for plant height (3.79), grain yield per plant (4.30), biological yield per plant (9.93). Specific Combining Ability revealed that NCEV-3 × NCEV-4 has best SCA for grain yield per plant (18.10). So these hybrids could be used in future hybridization for yield improvement.

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