

Research Article



Peach Rot Disease Prevalence in the Markets of Federal Capital Territory, Pakistan

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Abstract | Peach (*Prunus persica* L.) after plum is a major stone fruit in Pakistan. It belongs to the Rosaceae family. In Pakistan, peach with production of 72536 tonnes is grown on an area of 14350 hectares. A variety of diseases infect the peach tree. Among these diseases, brown rot disease is very important that reduces yields primarily by decaying the fruits on the tree and after harvest. A preliminary study was designed to see the prevalence, incidence and severity of peach rot disease in the markets of Federal Territories of Islamabad to estimate the intensity of the disease by calculating the disease index. The prevalence of disease was 100% in all markets of Khanna Pul, Burma Chowk, Taramri, NIH Market, Chatha Bakhtawar, I-8, I-10/2, I-10 (Markaz), Sabzi Mandi, I-9. Maximum Mean Disease Index 77.78% was found in the market of Khanna Pul which supplies the fruits to high class, middle class and poor class families. But the study reveals the importance of post-harvest handling of the peach till it reaches to the consumers.

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Introduction

Peach (*Prunus persica* L.) is an important stone fruit in Pakistan after plum. It belongs to the family Rosaceae. It is a temperate fruit. Peach fruit is best known for sweetness, juiciness, fleshiness, flavor and aroma. Due to these attributes, it is very delicious in taste (Yu et al., 2015). Fresh peach is rich source of vitamins A and C, contains potassium and fiber. The fruit has over 80% water and one average sized peach has 7% of the dietary fiber which is required each day.

Along with nutritional importance peaches are widely used in salads and milk shakes. The health benefits of Peach fruit include relief from hypokalemia, cancer, obesity, cholesterol, and blood stasis and neurodegenerative diseases. It helps in maintaining

healthy vision, skin care, nervous system, healthy bones and teeth. It has anti-aging properties and also helps in detoxification. It also improves digestion and cellular health. It has a wealth of essential nutrients and antioxidants which are valuable during pregnancy and it helps in strengthening the immune system (Habib, 2015).

In Pakistan, peach is grown on an area of 14350 hectares with production of 72536 tonnes. The province wise figures show that in Punjab peach is grown on area of 36 hectares, Khyber Pakhtunkhwa 9013 hectares and in Balochistan 5301 hectares with production of 222, 56776 and 15538 tonnes respectively in Punjab KPK and Balochistan (GoP, 2018).

Peach is cultivated in Pakistan in the areas of Peshawar,

Parachinar, Chitral, Hazara, Quetta, Pashin, Ziarat, Mastung, Skurdu, Hunza, Murree Hills, Chakwal and Swat (Habib, 2015).

Peach tree is infected by a number of diseases. The important ones are Brown rot or Peach rot, Peach Scab, Anthracnose, Bacterial Spot, Peach Leaf Rust, Leaf curl, Phony Peach Disease (PPD), Peach Tree Fungal Gummosis (Popenoe, 2017).

Among these diseases Brown rot disease is very important that reduces yields primarily by decaying the fruits on the tree and after harvest. All stone fruits are highly susceptible to this disease. Brown rot causing fungus is *Monilinia fructicola*. The brown rot is characterized by soft, brown decay of stone fruits. Decay begins as a small circular brown spot which rapidly expands to destroy the entire fruit. As the fruit softens during the ripening process, it becomes more susceptible to brown rot. Rotted fruits may fall from the tree or remain on the tree as mummies. The brown rot fungus also causes blossom blight and twig blight in the spring.

The fungus, *Monilinia fructicola*, overwinters in mummies and blighted twigs from the previous season. Spores released in the spring are carried by wind, rain and splashing water to susceptible tissues, such as blossoms and young fruit. Additional conidia are produced throughout the growing season during periods of warm, wet or humid weather. Fruit susceptibility increases with maturity; infections can also occur after harvest and in storage.

Mummies and small fruit left over from earlier thinning operations, as well as those simply lying on the ground, can be sources of inoculum. Blighted twigs should also be removed after the final harvest. Insect damage to the fruits can open up wounds that allow entry by the brown rot fungus. Take care to avoid fruit injuries during harvest.

Densely planted orchards or those partially shaded or surrounded by woods could have problems with reduced air movement. Poor air circulation can result in slow drying, thus leading to greater brown rot outbreaks (Hartman, 2007).

Peach rot or Brown rot affects the quality of peach and lowers its market value. A Preliminarily study was designed to see the prevalence, incidence and

severity of Peach rot disease in the markets of Federal Territories of Islamabad to estimate the intensity of the disease by calculating the disease index.

Material and Methods

A survey was done in the markets of Federal Capital Territory of Islamabad Pakistan. These markets included Khanna Pul, Burma Chowk, Tramri, NIH Market, Chatha Bakhtawar, I-8, I-10/2, I-10 (Markaz), Sabzi Mandi, I-9. The samples were randomly taken from the markets containing three peach fruits in a sample. The samples were taken in the paper envelop and labeled the location, sample type and date.

The samples were brought to Plant Pathology Laboratory of Crop Diseases Research Institute, NARC Islamabad and the observations for the following parameters were recorded.



Peaches samples taken from the markets.

Prevalence

Prevalence was defined as the presence of disease in the market. The disease was either prevailing or not prevailing in the markets.

Disease incidence (%)

The incidence was defined as the percentage of number of infected fruit among the sample population taken.

$$\text{Disease Incidence (\%)} = \frac{\text{No. of infected fruit}}{\text{Total No. of fruits in a sample}} \times 100$$

Mean disease incidence percentage was calculated from the sub locations surveyed in the market (Table 1).

Disease severity

The disease severity was defined as the percentage of infected area of fruit with spots clusters. The severity was based on the following rating scale (0-5):



Where; 0: means No disease; 1: means 1-10% disease; 2: means 11-20% disease; 3: means 21-30% disease; 4: means 31-49% disease; 5: means 50% or more disease. Mean disease severity rating (0-5) was calculated from the sub locations surveyed in the market (Table 1).

Disease index (%)

Disease index (%) is the actual disease scenario which is calculated by combining disease incidence and disease severity. Following is the formula of Disease index (%):

$$\text{Disease Index (\%)} = \frac{n1 (0) + n2 (1) + n3 (2) + n4 (3) + n5 (4) + n6 (5)}{N \times 5} \times 100$$

Where;

n1= No. of Plants having no disease 0; n2= No. of Plants with disease rating 1; n3= No. of Plants with disease rating 2; n4= No. of plants with disease rating 3; n5= No. of plants with disease rating 4; n6= No. of plants with disease rating 5; N= Total No. of fruits in a sample.

Results and Discussion

Prevalence of peach rot disease

The samples taken from various markets of Federal Capital Territory Islamabad showed that the prevalence of disease was 100% in all markets of Khanna Pul, Burma Chowk, Tramri, NIH Market,

Chatha Bakhtawar, I-8, I-10/2, I-10 (Markaz), Sabzi Mandi, I-9 (Table 1).

Mean disease incidence (%)

Maximum mean disease incidence was found 100% in the market of Khanna Pul followed by 53.33% in I-8, 44.44% was in both Tramri and I-10 (Markaz). Mean disease incidence 33.33 was observed in Burma Chowk, NIH Market and I-9 respectively. Mean disease incidence 22.22 calculated in I-10/2 and Sabzi Mandi. Minimum mean disease incidence 11.11 was present in Chatha Bakhtawar (Table 1).

Mean disease severity (0-5)

The maximum mean disease severity rating “3.89” was found in the market of Khanna Pul followed by 1.20 in I-8, 1.00 in Taramri, 0.78 both in I-10 Markaz and Sabzi Mandi, 0.67 in I-9 and NIH Market, 0.33 in Burma Chowk and 0.22 in I-10/2. Minimum mean disease severity 0.11 was recorded in the market of Chattha Bakhtawar (Table 1).

Table 1: Mean prevalence (%), Mean disease incidence (%) and mean disease severity of peach rot disease in the markets of federal capital territory.

Location	Mean prevalence (%)	Mean incidence (%)	Mean severity
Khanna Pul	100	100.00	3.89
Burma Chowk	100	33.33	0.33
Tramri	100	44.44	1.00
NIH Market	100	33.33	0.67
Chatha Bakhtawar	100	11.11	0.11
I-8	100	53.33	1.20
I-10/2	100	22.22	0.22
I-10 (Markaz)	100	44.44	0.78
Sabzi Mandi	100	22.22	0.78
I-9	100	33.33	0.67

Disease index (%)

No.	Location	Disease index (%)
1	Khanna Pul	77.78
2	Burma Chowk	6.67
3	Taramri	20.00
4	NIH Market	13.13
5	Chatha Bakhtawar	2.22
6	I-8	24.00
7	I-10/2	4.44
8	I-10(Markaz)	15.55
9	Sabzi Mandi	15.55
10	I-9	13.33

Disease index (%)

Maximum mean disease index 77.78 was found in Khanna Pul market followed by 24% in I-8, 20% in Taramri, 15.55% both in I-10 Markaz and Sabzi Mandi, 13.13% in NIH Market and I-9, 6.67% in Burma Chowk and 4.44% in I-10/2. Minimum 2.22% mean disease index was recorded in Chattha Bakhtawar.

Khanna pul market is having 100 percent incidence of peach rot. This market is in the centre of communities which are hi fi, middle class as well as poor communities. It is probable that the random sample was picked from a lot which is sold to poor communities. The severity of the disease was as higher as the incidence in the Khanna Pul market. This also resulted in the high disease index 77.78% in the market.

Other markets with alarming disease index included I-8 and Taramri Chowk. The disease index more than 15% is alarming not only in the orchard condition but as well as in the transit, storage and market condition. However, peach rot in most of the time is a storage and after harvest disease and has direct relation with temperature and humidity conditions in the surroundings.

The study also indicates that there may be the poor harvest handling and post-harvest management. This also indicates the poor condition of storage facilities available in the markets. This data can be eye opening

for the farmers, traders as well as the government to supply the best fruit to the end users.

Author's Contribution

Faisal Sohail Fateh: Idea conceived and technical input.

Zia Ur Rehman: Abstract and Methodology.

Abu Bakar Siddique: Conclusions.

Humayun Saleem: Collection of data.

Conflict of interest

The authors have declared no conflict of interest.

References

- GoP. 2018. Area, production of fruit, vegetables and condiments statistics of Pakistan, Ministry of national food security and research.
- Habib, S., 2015. Peach: Queen of fruits. Pak. Food J., pp. 26–27.
- Hartman, J.R., 2007. Peach fruit diseases. Cooperative extension service, University of Kentucky-college of agriculture.
- Popeno, J., 2017. Peach diseases. IFAS Extention. University of Florida.
- Yu, F., X. Shao, L. Yu, F. Xu and H. Wang. 2015. Proteomic analysis of postharvest peach fruit subjected to chilling stress or non-chilling stress temperatures during storage. Sci. Hortic. 197: 72–89. <https://doi.org/10.1016/j.scienta.2015.10.045>