

## Research Article



# Apricot Shot Hole Disease Prevalence in the Markets of Federal Capital Territory, Pakistan

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**Abstract** | Apricot (*Prunus armeniaca* L.) is a continental deciduous plant with cold winters that can withstand temperatures as low as  $-30^{\circ}\text{C}$ . The apricot has been used as a treatment for various diseases in Folk medicines. Shot hole which is a fungal disease caused by *Wilsonomyces carpophilus* is one of the diseases that target apricot. The purpose of the current study was to record the prevalence of shot hole disease on Islamabad's Federal Capital Territory markets. The frequency and severity of shot hole disease was estimated from market random samples, and later the index was measured. The results showed that in all markets with varying degrees of disease incidence, frequency and disease index the prevalence of shot hole disease was 100 per cent. It was concluded that the markets near poor colonies are merely selling cheap fruits and they are not concerned with the diseased fruits.

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## Introduction

Apricot (*Prunus armeniaca* L.) is a famous plant of continental region. Basically, it is a low temperature loving plant and can tolerate temperature as low as  $-30^{\circ}\text{C}$ . Countries round the world cultivating apricot include the Mediterranean countries, Central Asia, Russia, USA, Iran, Iraq, Afghanistan, Pakistan, Syria and Turkey (Asma et al., 2005).

The apricot has been used in medicines as a remedy for various diseases (Gilani et al., 2010). Its bark is used to soothe irritated skin. Kernel paste is used to heal vaginal infections. Apricot oil is used in cosmetics industry specially to protect the skin from ultra violet radiations and also as laxative and expectorant. Apricots are tasty even eaten fresh or when added in desserts, poached, stewed or pureed in jams, chutneys,

pickles, compotes, salads or sorbets. They are well served with meats and poultry. Baby foods from pulp of apricot are a good source of calcium, phosphorus and iron. The oil of seed is edible and oil cake can be used as organic manure. It is also reported to be use in asthma, constipation and cough (Ghasemhezhad et al., 2010). It is use in different scrubs, creams and face wash in market. It is use as adulterants.

In Pakistan apricot is grown on area of 22715 hectares with production of 141721 tonnes. The province wise area and production gives exact picture. In Punjab area of apricot under cultivation is 43 hectares; In Khyber Pakhtunkhwa 2707 hectares and Balochistan 19965 hectares with production of 255 tonnes, 11218 tonnes and 130248 tonnes respectively (GoP, 2018). In Pakistan, apricot is cultivated in KPK, Balochistan, Upper Punjab, Kashmir and major in Gilgit Baltistan

(GB) (Ullah et al., 2016).

A number of diseases attack apricot trees including Bacterial Canker (*Pseudomonas syringae*), Bacterial Spot (*Xanthomonas arboricola* pv. *Pruni*), Peach Scab, Perennial Canker (*Cytospora valsa*), Phytophthora Root, Crown Rot, Collar Rot, Brown Rot and Shot hole disease (Anonymous, 2012).

Shot hole disease has been found in stone fruit trees including peach, nectarine, apricot, plum, cherry and almond. The most common trees affected are apricot, peach and nectarine, and to lesser degree cherries. Stone fruit trees are economically important land- scape plants. The most limiting factor to their production is shot-hole disease (Woodward, 1999). Shot hole disease is known to be caused by the fungus *Wilsonomyces carpophilus*.

Shot hole disease appears in the form of spots on fruit and leaves in spring. In case of severe attack, leaf drop during spring. Symptoms on fruit include lesions that are light brown with dark purple margins; most of the times are clustered on the upper sides of fruit. Fruit spotting can be severe and as fruits mature, spots become scab like and may flake off, leaving roughened areas beneath. Leaf spots fall out (Anonymous, 2009).

Shot hole disease affects the quality of apricot and lowers its market value. Preliminarily a study was designed to see the prevalence, incidence and severity of shot hole 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, Taramri, NIH Market, Chatha Bakhtawar, I-8, I-10/2, I-10 (Markaz), Sabzi Mandi, I-9 (Figure 1). The samples were randomly taken from the markets containing five apricot 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.



Figure 1: Apricots 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 (%)

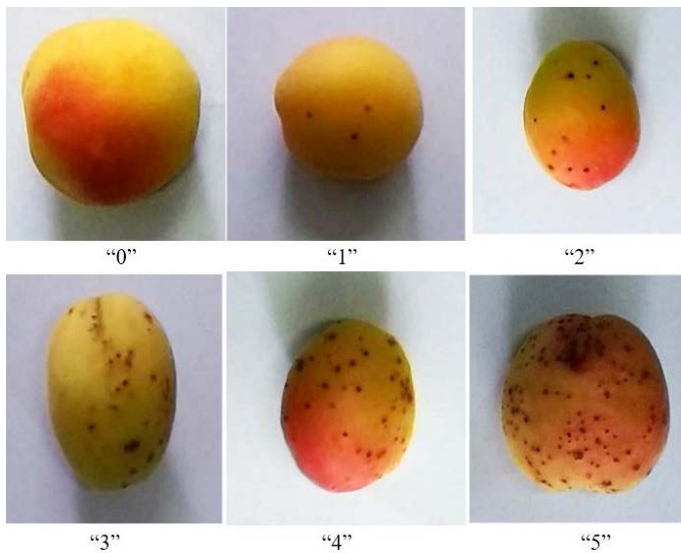
The incidence was defined as the percentage of number of infected fruits among the sample population taken.

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

Mean disease incidence percentage was calculated from the sub locations surveyed in the market.

### 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) as in Figure 2:



**Figure 2:** Visual disease severity rating scale (0-5) for shot hole of apricot. 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.

### 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 (%):

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

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 shot hole 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, Taramri, 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 percentage was found 100% in the markets of Khanna Pul, Taramri and Chatha Bakhtawar followed by 93.33% in Burma Chowk, NIH Market and Sabzi Mandi respectively. Mean disease incidence 73.33% was recorded in

I-10/2; 66.67% in I-8 and 60% in I-10 Markaz. Minimum mean disease incidence 50% was observed in I-9 market (Table 1).

**Table 1:** Mean prevalence (%), mean disease incidence (%) and mean disease severity of apricot shot hole disease in the markets of federal capital territory.

Location	Mean prevalence (%)	Mean incidence (%)	Mean severity
Khanna Pul	100	100	1.80
Burma Chowk	100	93.33	1.47
Taramri	100	100	1.07
NIH Market	100	93.33	1.27
Chatha Bakhtawar	100	100	2
I-8	100	66.67	1.20
I-10/2	100	73.33	1.40
I-10 (Markaz)	100	60	0.80
Sabzi Mandi (I-11)	100	93.33	1.80
I-9	100	50	1.20

**Table 2:** Mean prevalence (%), mean disease incidence (%) and mean disease severity of apricot shot hole disease in the markets of federal capital territory.

No.	Location	Disease index (%age)
1	Khanna Pul	36.00
2	Burma Chowk	29.33
3	Taramri	21.33
4	NIH Market	25.33
5	Chattha Bakhtawar	40.00
6	I-8	22.00
7	I-10 /2	29.33
8	I-10 (Markaz)	16.00
9	Sabzi Mandi	25.33
10	I-9	24.00

### Mean disease severity (0-5)

The maximum mean disease severity rating “2” was found in the market of Chatha Bakhtawar followed by 1.80 in Khanna Pul, and Sabzi Mandi. Mean disease severity rating in Burma Chowk, I-10/2, NIH Market, I-8, I-9 and Taramri was 1.47, 1.40, 1.27, 1.20, 1.20 and 1.07 respectively. While, minimum mean disease severity rating “0.80” was found in I-10 (Markaz) (Table 1).

### Disease index (%)

By combining disease incidence and disease severity the disease index (%) gives the exact situation of disease at any location. Shot hole disease index (%)



of apricot in the markets of Federal Capital Territory was much interesting and useful information for further studies. Maximum disease index 40.00% was found in Chattha Bakhtawar market followed by 36% in the market of Khanna Pul, and 29.33% was found respectively in Burma Chowk and I-10/2. Disease index 25.33% was calculated in the markets of NIH Market and Sabzi Mandi; 24% in the market of I-9; 22% in I-8 and 21.33% in Taramri. While, minimum 16% was found in I-10 Markaz.

Disease incidence (%) as well as disease severity rating both were both maximum in the markets of Chattha Bakhtawar Khanna Pul, Burma Chowk, and Sabzi Mandi, this shows that market people are least concerned with the quality of fruit. On the other hand, may be the customers demand only for cheap fruits. This also shows that the source orchards of the fruit are largely infected by the shot hole disease and need immediate attention.

This is of great importance to note that the Disease Index was more than 15 percent in all markets that is troubling to the trading circles about what they are offering. This means that all fruits approved for export are rejected. The maximum disease index (40 percent) was found in near-poor community of Chattha Bakhtawar. This also endorses that poor people demand for cheap fruit instead of the quality fruit. Minimum Disease index (%) was observed in I-8, I-9 and I-10 sectors which high living standard society. The fruit sellers fetch the selective quality fruits from major markets and people in these areas also look for the quality.

This study suggests that the source orchards can be attended immediately to control shot hole disease at orchard level, so that quality fruit is accessible to all communities residing in the territory of federal capital as well as in other parts of world.

### Author's Contribution

**Dr Faisal Sohail Fateh:** Idea conceived and technical input.

**Humayun Saleem:** Abstract and Methodology.

**Zia Ur Rehman:** Conclusions.

**Abu Bakar Siddique:** Collection of data.

### Conflict of interest

The authors have declared no conflict of interest.

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