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## An overview on *Alternaria* leaf in apple trees in Kashmir region

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### Abstract

Apples originated from Kazakhstan, in central Asia east of the Caspian Sea. Apples are also most popular in Jammu and Kashmir. Jammu and Kashmir's Horticulture is silently showing progress as the annual income generated by the fruit industry has crossed over Rs. 10,000 crore contributes 8% to Gross state domestic product [GSDP]. However, apple trees are prone to diseases like apple scab, *Alternaria*, Leaf blotch, and apple rot which devastate apple yields and cause major loss for apple growers. *Alternaria* blotch of apple is a pathogenic fungus affecting plants caused by three pathogens like *Alternaria brassicicola*, *Alternaria brassicae* and *Alternaria raphani* occurs mostly during winter season.

**Keywords:** Apple, significance, *alternaria*, classification, control, management

### Introduction

The whole region of Kashmir is leading producer of apples in India which contributes a major portion of about 75-80% [2023] of total apple production with 17 rank.

According to Mir Syed Shahid Ahmad Kamali-President of the federation chamber of industries, we thank India as we are getting heavy subsidies and support to promote the export of Kashmir products like apples etc. Kashmir apples has tremendous potential for enhanced production and export quality apples.

Kashmiri apple is famous in both the taste and appearance. It has gained fame in the export markets. Apple contributes 60-65% to the total horticulture crop production in Jammu and Kashmir from acreage of 50% [apple industry in Jammu and Kashmir].

The apple production sector is the backbone of rural economy because the majority of population in rural villages is involved in this sector. The total apple production in Kashmir region in the year 2020-2021 according to the Directorate Horticulture of Jammu and Kashmir was 1695000.00 metric ton. And in Jammu division it was 24415.69 metric ton. The whole UT of Jammu and Kashmir produce 1719415.69 metric ton of apples. The major producer was the valley of Kashmir. The Kashmir valley exports around 18 lakh metric tons of apples annually and produces 75-80% of total India apple production. The apple sector provides jobs to almost 3.5 million people contributing about 10% of the UT GDP. Like other crops apple is also attacked by number of diseases like apple scab, *Alternaria* leaf blotch and sooty blotch and many more post-harvest diseases like grey mold, Blue mold and Bull eyes rot etc.

In which *Alternaria* is considered as most threatened diseases in apple orchards. *Alternaria mali* also called as *Alternaria* blotch of apple is the pathogenic fungus affecting plants. An *Alternaria* disease poses a several threat to the apple production and productivity all over the last decade. *Alternaria* diseases in apple is causes several loss to apple industry in most of the apple growing regions of the world [Filajdic *et al.*1991] [4]. The occurrence of the diseases [*Alternaria mali*] in India was reported in 2002 in Kashmir valley of Jammu and Kashmir [shahzad *et al.* 2002] [5].

*Alternaria* leaf blotch caused by *Alternaria mali* is an economically important diseases of apples [*malus domestica* borkh] twenty one isolates of *Alternaria mali* [Am-1 to Am-21] were obtained during isolate collection.

In 2022 apple growers in south Kashmir are concerned about the outbreak of *Alternaria* leaf blotch in orchards causing huge scars on the leaves of tree.

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According to apple growers the diseases become evident on the leaves and trees spread over vast tracts of land after recent incessant rains.

Manzoor Ahmad Dar a grower from Hajin area of north Kashmir Bandipora said that those trees are shedding leaves and it could hit the yield of fruits we have spread different types of insecticides but still diseases is spread rapidly' he told a local news agency [KNO] meanwhile authorities have issued an advisory asking orchardists to ensure proper orchid sanitation.

Locals of north Kashmir especially handwara said that the recent rains caused Alternaria in apple plants. Fruit growers of Handwara told that in the aftermath of recent rains, the diseases have plagued the yield at many villages like Qalamabad, Mawar, Shahnagri, Audoora, Shanoo, Sheikhpura, Batgund, Hangah and its adjacent villages if no immediate measure is taken it may result in loss in crores for then they said.

Locals of Hajin area of district Bandipora told that at the end of June fruit growers in Kashmir face big challenge takes away leaves after any wet spell. The Alternaria fungus grows within 48 hours to three days and shows its symptoms when either the leaves start drying or copper –colour makes begin to appear on them soon most of the infected leaves start falling, thus not only affecting the quality and growth of fruits but also hindering the growth of next year's fruit buds as leaves are the lone source of food processing or photosynthesis for the tree.

According to Tariq Rasool SKUAST K; in Kashmir valley Alternaria effect only leaves not fruits. Alternaria develops in leaves when there is continuous rainfall in summer season 30% of Alternaria affects. The growers below 30% of Alternaria there is no threat for growers if Alternaria rises above 30% then growers should take accordingly spray like Hexaconazol, Xylum hexaconazol etc.



### Classification

Alternaria is a genus of deuteromycetes fungi. All species are known as major plant pathogens. They are also common allergens in humans, growing indoors and causing hay fever or hypersensitivity reactions that sometimes lead to asthma. They are present in the human mycobiome and rapidly cause opportunistic infections in immunocompromised people such as AIDS patients.

Kingdom: Fungi

Division: Ascomycota

Class: Dothideomycetes

Order: pleosporates

Family: pleosporaceae.

Genus: Alternaria.

### Symptomology

The symptoms start appearing on apple tree leaves it looks like as Brown to purplish irregular spots surrounded by a black border they can necrotic and defoliation can occur.

In some cultivators Alternaria occur like as Dark brown to black irregularly shaped leaf blades and petioles. Alternaria leaf spot appears as fairly large brown spots on leaves about 0.5 to 0.75 inch [12-18mm] in diameter. Leaf spot develops mostly in June and July trees can completely defoliated by early summer.

According to Mir Nasrullah an orchardist from pattan area of north Kashmir Baramulla said that Alternaria every year affects hundreds of orchards as the presence of moisture and humidity gives suitable environment to the Alternaria to come out. He also advised growers that avoid any spray after present rains as it surely will escalate the problem. Spray before rains if possible because 1 inch [2.5cm] of rain removes approximately 50% of fungicide and 2 inch [5cm] of rain will remove most of the residue.

### Control and management

Most of the fruit growers in Kashmir valley recommended strobilurin fungicides to get rid from Alternaria.

1. Protective spray of copper-based fungicide is recommended prior to development of new leaves during the end of autumn.
2. Selective pruning of a canopy's also reduces inocula present in twigs and buds in orchards.
3. Shredding leaf litter in the fall helps to reduce diseases pressure the following season this will also help in reducing apple Alternaria.
4. Controlling red mite population is essential to achieving control of Alternaria blotch.
5. Liquid copper fungicides such as monterey liquid-cop or bonide liquid copper fungicide are extremely effective for the control of Alternaria.
6. Chemical control of Alternaria can also be achieved through use of fungicide such as iprodine, mancozeb and captan [Osania *et al.* 1987 Asari and Takahashi, 1988].
7. Chopping leaves with a Mower or removing them from orchard level for the following season. Since defoliation from diseases more severe if high mite population are present, mites population should be maintained or below the established 1pm threshold.

### Conclusion

Alternaria leaf in apple tree has become most threatened diseases all over the world. Alternaria disease in apple tree cause most loss in apple industries and degrades the quality of apples. Growers should follow the controlling measures of Alternaria like proper scheduling of spray and use of suitable fungicides such as Monterey liquid-cop or Bonide liquid copper. Apply every 7-10 days as needed to reduce fungal growth and spread.

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