



Alternaria Leaf Spot of Coriander and Its Management

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Coriander of commerce is the dried ripe fruits of *Coriandrum sativum* (L.), also known as cilantro or Chinese parsley. Coriander one of the first spices to be used by humankind, Coriander spice is known as early as 5000 BC. The plant is an important member of the family *Umbelliferae* (*Apiaceae*). It is a small aromatic annual herb, attaining a height of 0.3-1 meters. The lower leaves are broad with crenate-lobed Margins, and the upper one is finely cut with linear lobes. The flowers are white or pinkish arranged in compound terminal umbels (Burdock and Carabin, 2009). The fruit is a nearly globular, yellow-brown schizocarp. It is grown as the principal crop of India during the winter months (Singh and Verma, 2015). The plant requires a warm, dry summer with short, rainy winters and is cultivated as a cold-weather crop in northern India, it is grown in almost all the states of country but mainly in Rajasthan, Madhya Pradesh, Andhra Pradesh, Tamil Nadu, Orissa, Uttar Pradesh, and Uttrakhand are the major growing states. In the traditional medicinal system, the leaves and fruits of the plant have been used to treat skin disease, and its paste is applied by mixing in water to wash the face and forehead. Also, it has been used as a carminative, stimulating, diuretic, tonic, stomachic agent by the people to get rid of the bad breath and mouth diseases. The leaves have been reported to treat convulsion, insomnia and anxiety and used to improve appetite (Rao *et al.*, 2020). The plant suffers from number of biotic and abiotic stresses which are detrimental to plant health and seed quality. Several diseases causing pathogens are soil borne, seed borne, associated with seed externally, internally, extra embryal, intra embryal, as contaminant and inert matter.

Diseases

Stem gall (*Protomyces macrospores*)

Stem rot (*Sclerotinia sclerotiorum*)

Wilt (*Fusarium oxysporum* f. sp. *coriandri*)

Powdery mildew (*Erysiphe polygoni*)

Root and stem rot (*Rhizoctonia solani* and *Macrophomina phaseolina*)

Alternaria leaf blight (*Alternaria alternata*) (Khan *et al.*, 1984).

Alternaria leaf spot (induced by *Alternaria alternata*) is a major disease of coriander. This disease causes on average 32-57% yield losses (Conn and Tewari 1990).

Symptoms

The target-board effect is the major characteristic symptoms of the genus *Alternaria*, which shows distinct bands of light and dark colours on leaf spot. Characteristic symptoms of this disease are appearance of brown or dark brown spots distributed on leaves, outlined by concentric lines inside the spots on tender stem and pods. Leaf blight occurs when circular or

irregular shaped spots coalesced to form large patches. Occasionally, dark spots can also be seen on tender stems and pods (Valkonen and Koponen 1990).



Pathogen: *Alternaria alternata* (Perfect Stage- *Lewia*)

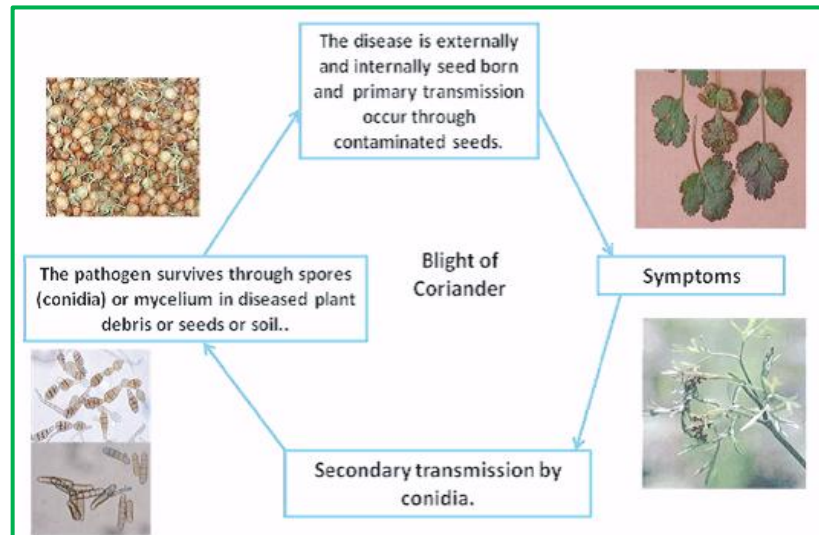
Alternaria is a necrosis-dependent opportunist pathogen. The genus is distinct from other genera by its muriform conidia (having both transverse and longitudinal septa). The pathogen having short beaked (light coloured) conidia which produced in chains.



Conidia

Disease Cycle

Alternaria alternata is seed borne in nature. It multiplied by conidia. *A. alternata* conidia disperse via air current and rainfall and causes infection in nearby healthy plant (polycyclic disease). The pathogen potentially through release of toxins (e.g alternariol, tenuuene, tenuazonic acid), leading to disease development and premature defoliation and its negative effect on yield.



Favourable condition

Moist (75%) and warm weather (12-25 C temp.) and intermittent rains favour disease development.

Management

The best way to control the disease is use of resistant variety (if available). [resistance to a single disease or multiple diseases (Malhotra and Vashishtha, 2008)]

Cultural practices:

- Removal of diseased seeds and inert matter from seed lot to be used as seed.
- Application of balanced fertilizer.

- Coriander should be grown in winter in areas free from frost, moderately cool with warm dry weather to avoid disease pressure.
- The diseased part should be removed or whole plant uprooted if needed.

Biological: Use of biocontrol agents (*Trichoderma* sp., *Pseudomonas fluorescens*, *Bacillus* sp. etc.) and phytoextracts (neem leaf, garlic leaf and clove extract etc.) and their combinations in controlling the disease. This is ecofriendly, user friendly approach for management of *Alternaria* leaf spot.

Chemical: Seed treatment is necessary with fungicides like Mancizeb, Bavistin + Thiram, Captan etc. Spray of systemic fungicides, triazole group, strobilurin based fungicides and the results of combination of these two groups are best in managing this disease.

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