

Menace of turcicum leaf blight in maize crop

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Introduction

Maize being one of the important cereal crops and after rice and wheat it is 3rd major crop in India. Maize is affected by number of fungal diseases of which leaf blight or northern corn leaf blight or turcicum leaf blight is one of the important diseases affecting photosynthesis with severe reduction in grain yield to an extent of 29 to 92%. It is caused by the fungal pathogen *Exserohilum turcicum*, formerly known as *Helminthosporium turcicum*. This disease can lead to significant yield losses if not managed properly. The Symptoms of Turcicum leaf blight typically appears as elongated, spindle-shaped lesions on the leaves of maize plants. These lesions are initially grayish-green and may later turn tan or brown. They often have a distinct, rectangular shape with a yellow or red border. In severe cases, the disease can cause entire leaves to wither and die. These symptoms can vary in appearance and severity depending on the stage of the disease and environmental conditions. One of the hallmark symptoms of Turcicum leaf blight is the development of spindle-shaped or elongated lesions on the leaves.

These lesions are often rectangular in shape and can be several centimetres long. In the early stages of the disease, the lesions are grayish-green or olive in color. They are often surrounded by a water-soaked, yellow to reddish-brown margin. As the disease progresses, the lesions expand in size. The central portion of the lesions may turn tan to brown, while the margin becomes more distinct, often reddish-brown. This gives the lesions a characteristic appearance. In severe cases, the lesions may coalesce, leading to large areas of damaged tissue on the leaves. These coalesced lesions can affect a significant portion of the leaf surface. Within the lesions, the plant tissue becomes necrotic (dead), leading to the development of dry, brown, or tan areas.

This necrosis can result in tissue death and reduced photosynthetic capacity, impacting the plant's overall health. In advanced stages of the disease, the affected leaves may wither and die. This can result in a loss of photosynthetic surface area, leading to reduced plant growth and yield. If environmental conditions are favorable, the disease can progress to affect the upper leaves

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of the maize plant, moving from the lower canopy to the upper canopy. In severe cases, Turcicum leaf blight can lead to the blighting of entire maize plants. This can result in significant yield losses. While the disease primarily affects the leaves, it can also cause lesions on other above-ground plant parts, including stalks, tassels, and ears. Under certain conditions, the pathogen may produce dark, spore-bearing structures (pycnidia) within the lesions, which can be visible on infected plant tissues. It's important to note that Turcicum leaf blight primarily affects maize leaves and can lead to reduced photosynthesis, which can impact crop productivity. The pathogen overwinters in crop residue, and when the conditions are favourable (warm and humid), it produces spores that are spread by wind, rain, or equipment. Infection usually starts on lower leaves and progresses upward. The disease cycle of Turcicum leaf blight in maize involves several stages, from overwintering in crop residue to the development and spread of the pathogen. The causal agent of Turcicum leaf blight, *Exserohilum turcicum*, overwinters in infected crop residues, such as maize debris left in the field after harvest. The pathogen survives in these residues in the form of mycelium and spores. As the weather warms up in the spring and early summer, the pathogen begins to produce primary inoculum,

which includes spores (conidia). These spores are essential for initiating new infections. The primary inoculum spores are spread to maize plants by various means, including wind, rain, and potentially through agricultural equipment and tools. These spores can land on maize leaves, especially on the lower canopy. When the primary inoculum spores come into contact with susceptible maize plants, they germinate and infect the plant. The infection typically starts on the lower leaves of the plant. Once the pathogen successfully infects the plant, it forms characteristic spindle-shaped lesions on the leaves. These lesions are initially greyish-green but may turn tan or brown with a yellow or red border as the disease progresses. As the disease lesions develop, they can produce secondary inoculum in the form of conidia. These secondary spores can serve as a source of infection for nearby plants. The disease can spread within the maize field as the conidia from infected leaves are carried by wind, rain, or mechanical means to other plants. This secondary spread can lead to the development of new lesions on healthy plants. The disease cycle continues as long as environmental conditions remain favourable for infection and lesion development. Warm and humid weather, as well as frequent rainfall, provide optimal conditions for the disease to thrive. When the growing season ends and maize is harvested, infected crop residues, including

stalks and leaves, are left in the field. These residues serve as a source of overwintering inoculum for the next season, completing the disease cycle. Foliar application of fungicides like mancozeb, propiconazole and zineb has been found to be effective against southern leaf blight of maize caused by *Helminthosporium maydis*.

Understanding the disease cycle of Turcicum leaf blight is essential for implementing effective management strategies. Timely interventions, such as planting resistant maize varieties, crop rotation, and proper sanitation, can help break the disease cycle and reduce its impact on maize crops.

