



***Cercospora* leaf spot of Okra: A Growing Challenge for Farmers and its management Strategies**

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Introduction

Okra (*Abelmoschus esculentus* L.) is a warm-season annual vegetable crop belonging to the family Malvaceae. It is an amphidiploid species ($2n = 130$) and is primarily propagated through seeds. The crop is believed to have originated in tropical Africa, particularly Ethiopia, and is now extensively cultivated in tropical and subtropical regions worldwide. It is popularly known as okra, lady's finger, bhindi, or gumbo. Owing to its wide adaptability, high nutritional value, and export potential, okra holds a prominent place in vegetable production systems. The tender pods are consumed in various forms as fresh, sliced, or dried and their high mucilage content makes them especially suitable for soups and gravies. Nutritionally, okra is a good source of vitamins A, B-complex, and C, along with essential minerals such as calcium, potassium, and iodine. It is also low in sodium, saturated fats, and cholesterol, enhancing its value as a health-promoting vegetable.

India is the leading producer of okra, contributing more than 70% of global production

(NHB, 2022). The crop is cultivated on approximately 0.5 million hectares, with an annual production exceeding 7 million tonnes. Among the states, Gujarat ranks first, followed by Madhya Pradesh, West Bengal, Bihar, Odisha and Uttar Pradesh. Despite its economic significance, okra productivity is constrained by several biotic and abiotic stresses. Among the biotic factors, insect pests and diseases are the major limitations, causing substantial yield losses. Important diseases of okra include Damping-off, Powdery mildew, *Cercospora* leaf spot, *Fusarium* wilt, Bacterial blight, *Okra Enation Leaf Curl Virus* (OELCuV), and *Yellow Vein Mosaic Virus* (YVMV). These diseases may cause yield losses of 20–30%, which can rise to 80–90% under severe conditions. Among fungal diseases, *Cercospora* leaf spot, caused by *Cercospora* spp., is one of the most economically significant constraints in all okra-growing regions in kharif season.

Causal organism and Symptomatology

Two *Cercospora* species, *Cercospora malayensis* and *Cercospora abelmoschi*, are

reported to cause leaf spot disease of okra in India. The fungus does not produce distinct leaf spots; instead, it grows as a sooty to dark olivaceous ectoparasite, covering the entire leaf lamina. The disease initially appears as small, isolated fungal growth on the lower surface of the leaf, but it rapidly spreads to both sides. The pathogen severely reduces the photosynthetic area of the leaf. Infected leaves droop, roll, and fall prematurely. The disease causes significant losses in both seed production crops and late-sown crops grown for green fruits. Occasionally, light brown lesions are observed after spores are washed off from the leaf surface by rainfall.

Epidemiology

Cercospora leaf spot of okra is strongly influenced by environmental conditions, host susceptibility, and inoculum load. Warm temperatures (25–30°C) and high humidity (>85% RH) favour disease development, with greater severity during the kharif season due to frequent rainfall and prolonged leaf wetness. The pathogen survives between seasons in infected plant debris, volunteer hosts, weeds, and occasionally seeds, as dormant mycelium or stromata, serving as the primary inoculum source. Under favourable conditions, conidia are produced and dispersed by wind and rain splash. In the presence of free moisture, they germinate and infect leaves through stomata or direct penetration, leading to small brown to grey necrotic lesions. The disease is polycyclic, with new conidia produced within 5–7 days, enabling rapid secondary spread under conducive conditions.

Integrated Disease Management

- Use resistant or tolerant varieties.

- Use certified, disease-free, high-quality seeds.
- Adopt wider spacing and proper plant geometry to improve aeration and reduce humidity within the crop canopy.
- Avoid overhead irrigation, particularly during evening hours, to minimize the duration of leaf wetness.
- Collect and burn defoliated leaves in the field to reduce the primary source of inoculum.
- Practice crop rotation with non-host crops such as onion and other vegetables to reduce pathogen load, as the pathogen survives mainly on infected okra and related host debris.
- Integrate and judiciously use fungicides in rotation, such as Thiophanate-methyl, Carbendazim + Mancozeb, and Strobilurin + Triazole combinations (e.g., Tebuconazole + Trifloxystrobin), for effective management under severe disease conditions.
- Spraying should be carried out immediately after the onset of the disease, as any delay may result in poor control due to the rapid secondary spread of the pathogen.

Conclusion

Cercospora leaf spot is a significant fungal disease that poses a serious threat to okra cultivation. The disease adversely affects the photosynthetic efficiency of plants, leading to premature defoliation and considerable yield losses. Its polycyclic nature and rapid secondary spread make timely management crucial for effective control. An integrated disease management approach combining the use of resistant varieties, clean cultivation practices, crop rotation, and proper canopy management can substantially reduce disease incidence.

Additionally, the judicious and timely application of fungicides plays a vital role in managing the disease under severe conditions. The sustainable management of *Cercospora* leaf spot not only enhances okra productivity but also contributes to improved crop quality and farmer profitability.

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