

***Cercospora* Leaf Spot of Brinjal and its Management**

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SUMMARY

Brinjal (*Solanum melongena* L.) is a widely grown vegetable crop which is highly productive and usually finds its place as the poorman's crop. Yield of brinjal have been rigorously abridged in various parts of the world as it is attacked by a number of diseases. Leaf spot of Brinjal caused by *Cercospora melongenae* is one of the most important fungal diseases which not only reduces the yield but also deteriorate the quality of fruits. Hence, there is a need of in depth study of the disease before formulation of management strategies. This article covers the information on the symptoms, causal organism, epidemiology, and management of *Cercospora* leaf spot of brinjal.

INTRODUCTION

Cercospora leaf spot on brinjal is one of the most common fungal infections of brinjal (Srivastava and Nelson, 1982) which is easily avoidable with proper care and management in the initial stage. But where the disease is severe, it can be fatal to plants. It is seen to have severe significance on Brinjal produce in the Philippines and other South-east Asian tropical islands. The genus *Cercospora* may reduce the photosynthetic area of mature leaves by over 75%, and close to 30% in young leaves. Leaf spot disease caused by *Cercospora melongena* is a major problem for large-scale growers and backyard gardeners (Gonsalves *et al.* 1994) posing a serious threat to the commercial cultivation of the crop.

Symptomatology

This disease affects the leaves, petioles, stems and peduncles of the brinjal plant. Symptoms appear first on older, lowest leaves first, and if unchecked can move upwards and infect young leaves and stems. The disease is characterized by small, chlorotic lesions (up to 1 cm dia), circular to oblong, later turning necrotic with a sporulating light greyish-brown center and a dark-brown margin. These lesions often resemble frog eyes, giving this disease its common name. As the lesions dry, the centers crack and drop out. Concentric rings may be observed as individual lesions expand. The spots are mostly irregular and coalesce to cover large areas of the leaf. The spots on leaves can easily be confused with spots caused by a bacterial disease. On closer inspection, however, the spots due to *Cercospora* show distinguishing features like stomata having black spots that can be readily observed using a hand-held magnifying lens. Bacterial leaf spots, conversely, are irregularly shaped or circular spots with clear stomata (Windels *et al.*, 2003). Severely infected leaves may dry out and curl and prematurely drop off the plant, often causing a reduction in yield (Chupp, 2006). The pathogen does not infect brinjal fruits but does reduce the growth of plants by reducing the photosynthetic area of mature leaves, ultimately reducing fruit yield.

Causal organism: *Cercospora melongenae* Welles.

The fungus belongs to Division- Ascomycota, Class- Dothideomycetes, Order- Capnodiales, Family- Mycosphaerellaceae, Genus- *Cercospora*, Species- *melongena*. The genus *Cercospora* is a hyphomycete fungus comprised of many plant-pathogenic species. They produce leaf spot diseases on a wide range of agriculturally important plants. *Cercospora melongenae* Welles is primarily confined to brinjal species (Welles, 1922) *viz.*, *Solanum melongena*, *S. aethiopicum* and *S. incanum* etc. Fungi in the genus *Cercospora* produce the plant toxin cercosporin, which causes the leaf spot appearance. Cercosporin is a photosensitizing perylenequinone plant toxin that absorbs light energy and converts it into a highly activated state.



Small, circular to oblong, chlorotic lesions



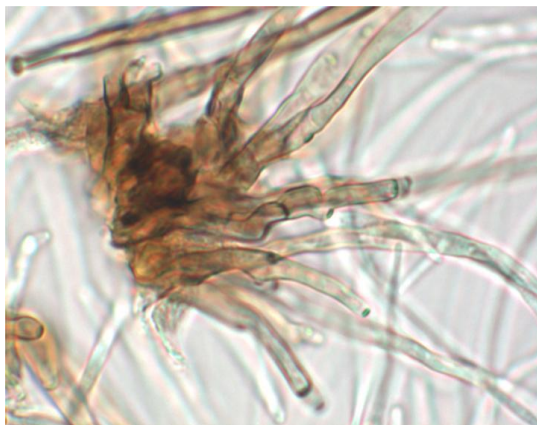
Dry out and curling of leaf

Figure 1. Cercospora leaf spot symptoms on brinjal leaves

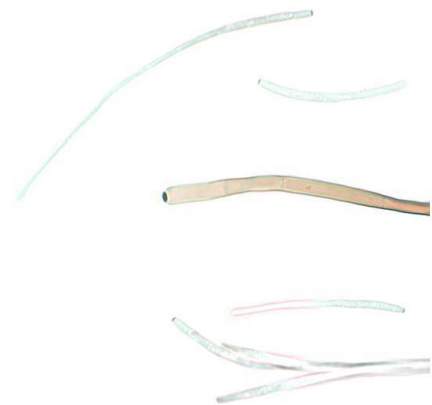
This activated state then reacts with molecular oxygen to form activated oxygen, which in turn reacts with proteins, lipids, and nucleic acids causing damage or cell death. The fungal spores are not harmed by the production of this toxin because they produce pyridoxine which neutralizes the reaction. While the toxin damages the host cells, conidia is produced and is able to infect the current host or spread to other susceptible hosts in the area.

Conidiophores: Conidiophores arising from black stromata mainly on lower surface of leaf, in fascicles (clusters) of 3 to 12, pale to medium brown, paler towards the apex, $20\text{--}150 \times 4\text{--}6.5 \mu\text{m}$ in size, occasionally septate, and unbranched, and they bear hyaline, mildly curved conidia (Mycobank Database 2012). Conidiophores usually continue to elongate, producing successive conidia, and hence 2 or more widely spaced scars.

Conidia: Conidia $40\text{--}150 \times 3\text{--}5 \mu\text{m}$, hyaline, 4–14 septate, smooth, acircular, straight or slightly curved, tip rounded, basal cell truncate with distinct scar.



Conidiophores in fascicles (clusters)



Pale brown conidiophore and mildly curved, hyaline conidia

Figure 2: Morphological characters of *Cercospora melongena* under microscope

(Source: internet)

Epidemiology

Cercospora melongenae can survive for at least one year in infected plant debris or in soil. The disease progresses when the fungal spores are dispersed to susceptible plants by rain, irrigation water, wind or mechanically by agriculture equipment or by people (Nelson, 2008). Leaf wetness, warm weather conditions and high relative humidity favor infection and disease development.

Cercospora melongenae is a polycyclic disease and heavily dependent on a moist or wet environment, an extremely heavy rainy season is conducive for larger and greater conidia production and dispersal. The conidia

enter through the stomata of the leaves or other natural openings or wounds on the plant where they must have water or moisture in the form of heavy dew in order to germinate. Less susceptible brinjal varieties, such as the Siamese variety, signs and symptoms of *Cercospora melongenae* can be unseen and not appear until at least four weeks after the start of the dry season.

Management

A calendar-based protectant fungicide spray program combined with cultural practices can help reduce losses from *Cercospora* Leaf Spot.

- Crop rotation with other vegetables and sanitary procedures are the most effective method to lower field inoculum levels.
- Mulch and furrow or drip irrigation should be done to help reduce spread of the pathogen from splashing water.
- Preventing inoculum spread by preventing excessive moisture and humidity accumulation which can be done by weed control, irrigating in the morning, avoiding overhead sprinkler irrigation, increasing aeration at base of plants, using covers to minimize dampness.
- This disease may live in plant debris or soil for at least one year, so burning, or throwing away any infected matter is very important.
- Spraying the affected plants with Bavistin (0.1%) or Chlorothalonil (2 g/litre of water) is useful for the disease control.

REFERENCES

- Chupp, C. (2006). Manual of Vegetable Plant Diseases, Discovery Publishing House, India.
- Gonsalves, A.K. and Ferreira, S. (1994). *Cercospora* primer. http://www.extento.hawaii.edu/kbase/crop/Type/cer_prim.htm - DISEASES (accessed 28 February 2012).
- Gopalan, C.; Rama Sastri, B.V. and Balasubramanian, S. (2007). Nutritive Value of Indian Foods, published by National Institute of Nutrition (NIN), ICMR.
- Nelson, SC. (2008). *Cercospora* leaf spot and berry blotch of coffee. University of Hawai'i, CTAHR Cooperative Extension Service.
- Srivastava, S. and Nelson, S. (1982). "Cercospora Leaf Spot of Eggplant" University of Hawai'i at Manoa. College of Tropical Agriculture and Human Resources. Plant Disease. **82**:1-5.
- Welles, Colin G. (1922). "Cercospora Leaf Spot of Eggplant". *Phytopathology*. **12**: 2.
- Windels, CE, Bradley, CA, and Khan, MFR. 2003. *Cercospora* and bacterial leaf spots on sugarbeet. <http://www.ag.ndsu.edu/pubs/plantsci/rowcrops/pp1244.pdf> (accessed 28 February 2012).