



TECHNICAL DOCUMENT ON CHARCOAL ROT OF CUCURBITS

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ABSTRACT

Charcoal rot of cucurbits is a serious disease spreading all around the world. Therefore, this technical document summarizes the current knowledge of cucurbits charcoal rot disease epidemiology, symptoms and signs, disease cycle, ecology and disease management strategies. Charcoal rot disease is caused by the pathogenic fungus *Macrophomina phaseolina*. The fungi belong to the family Botryosphaeriaceae, order Botryosphaerales, class Dothideomycetes and phylum Ascomycota. *M. phaseolina* is characterized by the production of both pycnidia and sclerotia in host tissues and culture media. The disease symptoms on the plant represented by appearing spindle-shaped, water-soaked lesions on the stem, vine decline, wilt, and decline of the host plant resulting in plant death. Lesions dried out progressively, turned tan and cracked. So, affected plants decline and die before harvest. Sunken cankers also, appear on seedlings. The fruits also attacked by the fungus, especially, these which were in contact with the soil. Abundant black microsclerotia associated with the infection sites. These microsclerotia are distributed generally in clusters at the soil surface and are localized mainly at a depth of 0-20 cm. They can survive for 2-15 years depending on environmental conditions and presence of plant residues. So, they are considered as the main surviving propagules across different seasons. The plant root exudates induce germination of these microsclerotia and resulting in root infection. The charcoal rot disease can be managed by decreasing pathogen propagule in soil and host roots and avoiding favorable conditions for further pathogen survival and propagation. Agricultural methods (irrigation type, fertilization with organic amendments, tillage, etc.), grafted plants and solarization can affect charcoal rot disease. There are some chemical fungicides such as azoxystrobin, difenoconazole, carbendazim and benomyl can be used under laboratory and field conditions for disease controlling. Management strategies for controlling this disease also include using biocontrol agents such as *Bacillus* spp., *Streptomyces* spp., *Pseudomonas* spp., *Trichoderma* spp., *Gliocladium* spp. to prevent host infection or to suppress the growth of the pathogen and reducing the disease. All methods achieved a significant controlling of the disease and reduced the disease severity with different degrees.

Keywords: Charcoal rot; cucurbits; disease cycle; disease management; *Macrophomina phaseolina*.