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Charcoal rot of soybean is most prevalent in the southern United States but can occur in the North Central region when hot and dry weather conditions exist. The fungus that causes charcoal rot also causes charcoal stalk rot in corn.



Charcoal rot symptoms on soybean caused by *Macrophomina phaseolina*. Photo credit: Theresa Hughes

dry soils as microsclerotia embedded in plant residue. Initial infection occurs in the spring when soil moisture is high. The fungus infects the roots and then grows very slowly in the plant tissues until plants reach the reproductive stages, usually coinciding with the hottest driest part of the growing season. *M. phaseolina* is most active when soil temperatures are high (80-95°F).

Charcoal rot infected plants may display a premature yellowing of the top leaves and premature leaf drop. Infected plants will wilt in the midday heat and recover at night until permanent wilt point is reached. In some cases, the upper third of the plant may have unfilled, flat seedpods. At flowering, a light gray discoloration develops on the epidermal and sub-epidermal tissues of both the tap and secondary roots and lowers stems. The survival structures (microsclerotia) of the fungus will be present on the outer tissues.

Charcoal rot is caused by the fungus *Macrophomina phaseolina*, which survives in

Management of Charcoal Rot

The symptoms of charcoal rot, premature yellowing of top leaves and premature leaf drop, are easily mistaken for normal maturity. Seedlings are often infected early in the season but the symptoms do not develop until plants are in the reproductive stages, and under drought and heat stress. By the time symptoms are evident, control of the disease is difficult and losses in yield are likely inevitable. Foliar fungicides and fungicide seed treatment have no effect on charcoal rot. Any cultural practices that minimize plant stress will reduce the risk of charcoal rot. Management practices that reduce drought stress including tillage practices that maintain soil moisture (e.g. no-till), lower plant populations, good weed control, irrigation and optimized fertility levels (particularly phosphorus). A moderate level of partial resistance is known in soybeans in the group IV and above maturity groups. It is not well known if any partial resistance is present in commercial varieties suitable to be grown in Wisconsin (maturity group I-II). It is important to plant high quality, pathogen-free seed to avoid charcoal rot.