Charcoal Rot Identification and Management

**Key Points**

- Charcoal rot is caused by the fungus *Macrophomina phaseolina*, which infects more than 500 host species including soybean.
- Depending on the level of infection and environmental conditions, charcoal rot can cause moderate to severe yield loss.
- Charcoal rot symptoms are most prevalent during hot, dry weather, especially when occurring during reproductive growth stages.

**Identification**

Symptoms of charcoal rot usually begin during soybean reproductive growth stages and are first evident in the driest areas of a field. Premature plant death resulting in leaves that remain attached is the most common symptom. A gray discoloration (like pencil shading) of root and stem tissue develops below the outer tissues. A diagnostic feature of charcoal rot is the presence of microsclerotia, which appear as black speckling on the lower stem. When viewed with a hand lens, individual microsclerotia can be seen within plant tissue. Reddish-brown discoloration can also develop in the pith and vascular tissues. The presence of unfilled upper pods and general low plant vigor may be a sign of charcoal rot later in the season. In some cases, the upper one-third of the plant may have only flat pods without seed. Plants infected with charcoal rot typically mature weeks earlier than expected, further reducing yield potential.

Zone lines, or thin, dark lines visible in soybean stem or root tissue have previously been characterized as a symptom of charcoal rot. However, it has been concluded that zone lines are instead associated with a different fungus and not a symptom of charcoal rot. Recent studies within Monsanto and at the University of Arkansas have concluded that these zone lines are instead associated with infection by the fungus *P. longicolla*.1,2

**Management**

- Rotating with a non-host crop (i.e. wheat) for two or more years can help reduce inoculum levels in fields with a history of charcoal rot.
- Soybean products with the highest level of resistance available within an appropriate maturity group should be selected.
- No-till systems can increase soil microbial activity and help conserve soil moisture, which can reduce charcoal rot.
- Reduce plant stress. Irrigation, especially during reproduction, and/or reduced plant populations can reduce the severity of symptoms during drought conditions.

**Summary**

Depending on environmental conditions, charcoal rot can reduce soybean yield potential. Proper identification of this disease will help in making successful management decisions.

**Sources**


For additional agronomic information, please contact your local seed representative. Individual results may vary, and performance may vary from location to location and from year to year.