

Stem zone lines in soybeans are not associated with charcoal rot.

Alemu Mengistu, USDA, Agricultural Research Service, Crop Genetics Research Unit, and Heather Marie Kelly, University of Tennessee Extension, Jackson, TN

Charcoal rot, caused by the fungal pathogen *Macrophomina phaseolina*, is an economically important disease on soybean and other crops. The disease is characterized by the formation of microsclerotia under the epidermis of the lower stem (Fig. 1 A) and in the vascular tissues of the roots and stem (Fig. 1 B).

However, zone lines (thin black lines in the lower stem cortex, Fig. 2) of soybeans have been shown to occur in combination with symptoms of charcoal rot in the vascular tissues. These zone lines are not caused by the charcoal rot fungus but are caused by *Diaporthe longicolla*, a seed borne pathogen causing Phomopsis seed decay ([Olsen et al. 2015](#)).

Many soybean varieties will exhibit zoning of Phomopsis seed decay and/or microsclerotia of charcoal rot at R8 growth stage (full maturity) in the lower stems and roots. Screening for resistant or tolerant soybean lines are actually evaluated at growth stage R7 (beginning maturity).

Best management practice is to utilize variety disease ratings (company ratings and UT available info <https://search.utcrops.com/>) to find varieties that have resistance/tolerance to charcoal rot and Phomopsis seed decay.



Figure 1. Microsclerotia are pepper-like structures found under the epidermis (A) and in pith of the inner tissue of the soybean stem and roots (B).



Figure 2. Zone lines associated with *Diaporthe longicolla* appear on the inside of lower soybean stems and roots when split longitudinally. Lines are thin and dark, appearing in irregular patterns and small circular shapes in mature soybean plants.