



Red Crown Rot in Soybean

Red crown rot (RCR) is a disease that typically occurs in the Delta and East Coast regions of the US where soybean is grown in rotation with peanut. Peanut suffers from *Cylindrocladium black rot* (CBR), a disease that is caused by the same fungus as soybean RCR. However, in contrast to CBR, RCR has received little interest since it was first described in 1973 due to low incidence in those regions and relatively negligible impact on yield. However, this changed when RCR was first reported in soybean in Illinois (2018) and then in Kentucky (2021), with yield losses of up to 30 bushels/acre.

RCR (and CBR) is caused by the fungus *Calonectria illicicola* (syn. *Cylindrocladium parasiticum*), which survives as microsclerotia in crop residue and soil. The microsclerotia can persist for several years and can be spread locally by wind and farm equipment.

As there is still little known about RCR, management relies on crop rotation (to reduce microsclerotia) and cultural practices like late planting and improved drainage to avoid conditions that favor infection and disease development. Rotation with peanut should be avoided.

How to identify RCR

Symptoms of RCR typically develop after R3 and will first develop in low-lying or poorly drained areas of the field. Foliar symptoms begin as areas of light-yellow discoloration that eventually progress to interveinal necrosis, chlorosis, leaf death, and defoliation (Figure 1). These symptoms are like those associated with sudden death syndrome, brown stem rot, and stem canker. RCR and stem canker can also result in plant death (Figure 2).



Figure 1. Early (left) and later (right) foliar symptoms of soybean red crown rot. Note the similarity to sudden death syndrome foliar symptoms. Image from Terri Hughes.



Figure 2. Soybean plant killed by red crown rot (RCR-left) and a field with a high incidence and severity of RCR (right). Image from Terri Hughes.

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Stem symptoms begin with a reddish discoloration of the lower stem (Figure 3). The vascular tissue of the lower crown may show a brown to gray discoloration.¹ A red discoloration can also occur, but the tissue below the epidermis will not be discolored (Figure 4).



Figure 3. Red discoloration of the lower stem associated with red crown rot (RCR). Surface tissues (left). Discoloration just below the epidermis (middle). Internal discoloration of stem tissue (right). Image from Terri Hughes.



Figure 4. Red discoloration of the lower stem. Left-surface tissues. Right-healthy tissue just below the epidermis. Image from Terri Hughes.

If high levels of moisture occur late in the growing season, the discolored areas will exhibit white hyphae (thread-like fungal growth) and red to rusty-brown spore-bearing structures (perithecia) (Figure 5).

The roots of infected plants become rotted and the plants are easily pulled (Figure 6). Plants infected with RCR can experience root rot even without foliar symptoms. Infected plants can also be shorter than neighboring healthy plants. Stem symptoms can look like other stem diseases including charcoal rot, *Rhizoctonia* root rot, and *Phytophthora* stem rot.¹



Figure 5. Perithecia of *Calonectria ilicicola*. These structures are diagnostic for red crown rot. Image from Terri Hughes.



Figure 6. Root rot associated with red crown rot. Image from Terri Hughes.

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Sources

¹2019. Red crown rot of soybean. Crop Protection Network.

<https://cropprotectionnetwork.org/encyclopedia/red-crown-rot-of-soybean>

Legal Statements

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. Performance may vary, from location to location and from year to year, as local growing, soil and environmental conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on their growing environment.

The recommendations in this material are based upon trial observations and feedback received from a limited number of growers and growing environments. These recommendations should be considered as one reference point and should not be substituted for the professional opinion of agronomists, entomologists or other relevant experts evaluating specific conditions.

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