

Managing RCR in Soybeans

Where the Research Stands and Where It's Headed

By Christina Xie

Red Crown Rot (RCR) has emerged as a significant threat to soybean production in the United States, expanding northward from traditional southern strongholds into the Midwest. To provide farmers and industry stakeholders with current, expert-grounded guidance on RCR management, we interviewed six specialists representing academic institutions, agricultural associations, and agrochemical companies.

Stephanie Porter, Outreach Agronomist for the Illinois Soybean Association, draws on extensive grower feedback through the ISA Growing Concerns



■ Red crown rot has caused significant damage to soybean cultivation.

Survey, documenting yield losses of 20–50% in affected field areas. From the university sector, Martin Chilvers, Professor of Plant Pathology and Extension Specialist at Michigan State University, and Carl Bradley, Professor

of Plant Pathology and Extension Specialist at the University of Kentucky, contribute complementary perspectives grounded in multistate field research, controlled laboratory work, and fungicide efficacy trials. Both emphasize the importance of accurate diagnosis, characterization of variety responses, and integrated management approaches. From the seed treatment industry, Leo Zappe, Global Portfolio Management Seedcare & Biologicals, and Jader Caricati, Global Product Management Lead – Seedcare, both from Syngenta, discuss the development and

performance of VICTRATO® and SALTRO®, including their performance across diverse Midwest environments and interactions with broader soilborne disease complexes. Willem-Jan Meulemeesters, General Manager of Gowan Netherlands, represents the biological seed treatment perspective, specifically addressing CeraMax and natamycin-based approaches.

The interviews reveal several consistent themes. First, accurate diagnosis remains challenging, as RCR symptoms closely resemble Sudden Death Syndrome and other soilborne diseases, requiring hands-on scouting and laboratory confirmation. Second, seed treatments remain the most reliable near-term control, with products such as VICTRATO® and SALTRO® demonstrating strong performance in field trials, though efficacy varies by location and growing conditions. Third, integrated management—combining chemistry, genetics, cultural practices, and proper field monitoring—offers the most durable path forward.

FACTS & FIGURES

Pathogen: *Calonectria ilicicola*

Disease Type: Soilborne fungal disease

Plant Part Affected: Roots and lower stems; foliar symptoms secondary

Symptom Appearance: R3–R4 growth stages (early reproductive)

Diagnostic Sign: Red/maroon discoloration and red perithecia at stem base

Yield Loss Range: 15–80% (field-dependent; 20–50% typical in Midwest)

Pathogen Persistence: Microsclerotia survive 5–7 years in soil

Favorable Conditions: Wet soils, poor drainage, compaction, plant stress

Geographic Distribution: Southeastern U.S. (endemic); Midwest (emerging; 7+ states as of 2026)

Current Best Practice: Match seed treatment selection with field history and disease pressure

Available Solutions: VICTRATO®, SALTRO®, ILEVO®, CeraMax®



Stephanie Porter

Illinois Soybean Association Outreach
Agronomist

? As Red Crown Rot (RCR) expands its footprint from the South into the Midwest, how would you characterize the current threat level to soybean production? In your view, what makes this pathogen uniquely difficult to manage compared to other established soilborne diseases like Sudden Death Syndrome (SDS)?

In Illinois, this red crown rot (RCR) is high threat based on the answers from hundreds of farmers that have participated in the Illinois Soybean Association (ISA) Growing Concerns Survey. Once this disease becomes established, it can cause between 20% to 50% yield loss in certain areas of the field, but this depends on the year.

It is difficult to manage

because we are still learning about the RCR “disease triangle” or the pathogen, host range, as well as favorable conditions in which it occurs. I believe an



- Imagery from Illinois soybean field known to have red crown rot pressure. (Credit: Dr. Boris Camiletti, University of Illinois)

often-overlooked fact is the pathogen of RCR, *Calonectria ilicicola*, is that several recognized (such as alfalfa, clovers, peanuts, and some woody plants) as well as some unidentified plant species within Illinois could potentially serve as alternate hosts for the RCR pathogen.

? How can farmers better differentiate between early-season RCR symptoms and other common root rots, and how does this diagnostic challenge complicate your outreach and management advice?

Differentiating RCR from other soybean diseases is difficult because aboveground symptoms such as

interveinal chlorosis and necrosis closely resemble SDS, brown stem rot, and stem canker. As a result, accurate diagnosis requires in-field scouting around the soybean growth stages of R3 to R4, when plants can be dug up and examined at the crown.

Producers should look for characteristic reddish discoloration and small red fungal structures (perithecia) on the stem base, though these signs may not always be visible without adequate moisture or at certain growth stages. Scouting can be particularly tricky from mid-July through mid-August, as symptoms are often subtle and scattered, appearing as isolated chlorotic, necrotic, or



- Soybean stems with red crown rot at their base. (Photo: Stephanie Porter)

wilting plants rather than widespread field patterns visible from the road. From late August into September, plants infected with RCR are often dead and too degraded for clear diagnosis, frequently resembling a generalized black rot.

This complexity is compounded by the fact that multiple diseases often coexist in affected plants, while the pathogen’s microsclerotia can spread easily by wind, water, birds, and equipment. Together, these factors make timely and accurate diagnosis difficult, complicating outreach efforts and requiring agronomists to emphasize hands-on scouting and accurate diagnosis when advising farmers on management strategies.

? You have identified seed treatments as the most effective current defense, yet we see varying levels of performance in the field. From an agronomic perspective, what specific characteristics should a grower look for in a seed treatment package to ensure optimal RCR suppression? Furthermore, in cases where early-season pressure is extremely high, how are you guiding farmers to prioritize seed treatment selection alongside other risk-management tools?

Field trials conducted by the University of Illinois and supported by the Illinois Soybean Association check-off demonstrate that fungicide seed treatment performance against RCR can vary widely depending on the product and growing

conditions. Among currently registered seed treatments, however, Saltro® consistently delivered the most effective disease suppression and the strongest yield protection in RCR-infested fields. ILEVO® and CeraMax® also provided measurable benefits, though their performance was more variable across locations.

These findings underscore the importance of early-season protection. Infections that occur shortly after planting tend to result in the greatest yield losses, although disease development through the R1 growth stage can still significantly impact productivity. For fields with a known history of RCR, growers are encouraged to select proven fungicide seed treatments, with Saltro® standing out as the most reliable option for both disease control and yield preservation.

However, Victrato® (Tymirium), the newest option, is emerging as the most effective overall seed treatment in recent University trials, sometimes outperforming Saltro.

? What specific cultural or management practices are showing the most promise in your recent ISA-led discussions, in addition to seed treatment?

- Avoid rotations with other host crops such as clover or alfalfa, which can increase inoculum levels. Rotation with corn helps to reduce, but does not eliminate this pathogen, which can survive years in the soil.
- University of Illinois check-off funded satellite and drone

imagery has shown that RCR often appears in low lying areas or in patches. Over time, the spread of the disease across the field can be limited by no-till management practices.

- This disease appears to thrive in wet soils, so the improvement of field drainage is suggested.
- This pathogen could be spread by birds, deer, machinery, or water. It is encouraged to attempt to clean equipment to limit disease spread.
- When conditions are favorable, disease severity appears to be increased when soybeans are stressed by other factors such as compaction; therefore, the prevention of additional plant stress is advised.
- University of Illinois check-off funded research on interaction with soybean cyst nematode (SCN) is currently ongoing and we look forward to year two results from the field.

? Beyond current chemical seed treatments, where do you see the next breakthrough in RCR management coming from? Are we looking toward new biologicals, precision detection technologies, or perhaps gene-editing for true varietal resistance in the next 3–5 years?

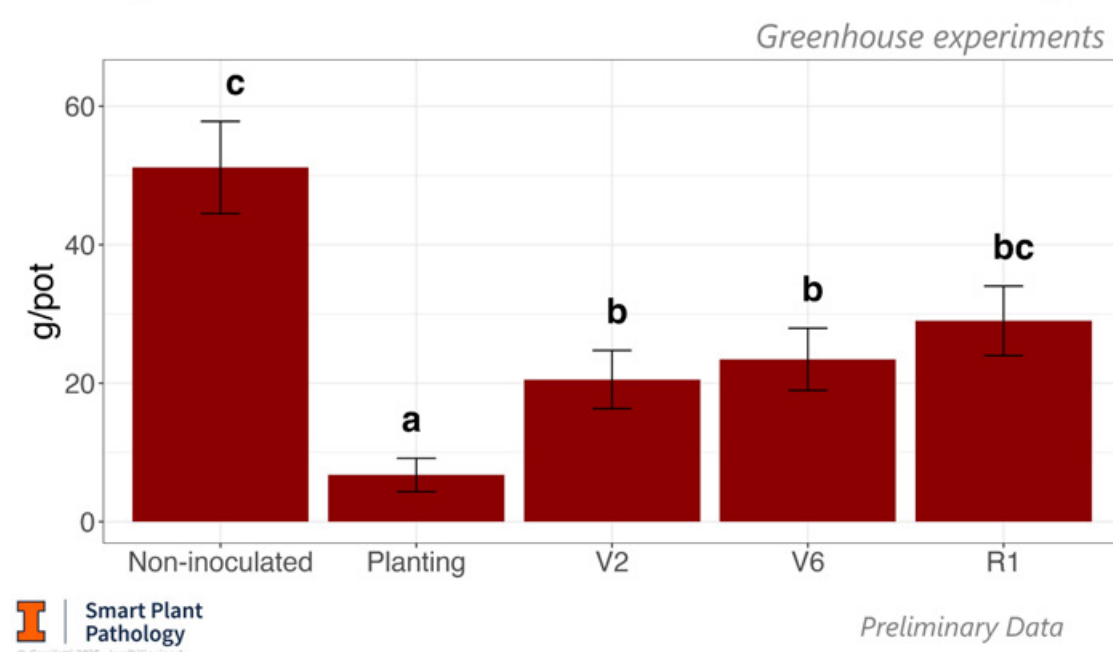
University of Illinois research funded by the Illinois Soybean Association collected satellite and drone imagery

from Illinois soybean fields with known RCR pressure and paired it with field disease measurements to train a machine learning model to detect canopy-level disease patterns. The model was then applied to commercial fields to identify disease hotspots and guide ground checks and field trial placement.

University of Illinois biological testing in growth chamber and greenhouse experiments, sponsored by the Illinois Soybean Association Check-off, indicate biological products alone cannot reliably control RCR or replace proven chemical seed treatments. While some products showed limited activity, none consistently provided meaningful protection beyond standard fungicide seed treatments. For fields with a history of RCR, farmers should prioritize chemical seed treatments and consider biologicals only as supplements if future products demonstrate clear added value.

The future RCR research should be focused on gene-editing for true varietal resistance because there currently are no highly resistant soybean varieties, but tolerance differences do exist. In addition, attempts should be made to screen soybean germplasm collections to find rare resistant alleles by way of improved methods. Lastly, more research is needed to learn more about disease epidemiology as well as alternative disease hosts.

Early Infections Resulted in the Lowest Seed Weight



- Graph showing early infections of red crown rot result in lower seed weight or greater yield loss. (Credit: Dr. Boris Camilletti, University of Illinois)