Journal of Plant Physiology & Pathology

Perspective A SCITECHNOL JOURNAL

The Effects of Brown Stem Rot in Soybeans and Control Strategies

Meng Li*

Department of Crop Sciences, University of Illinois at Urbana-Champaign, and Illinois Natural History Survey, Champaign, USA

***Corresponding Author:** Meng Li, Department of Crop Sciences, University of Illinois at Urbana-Champaign, and Illinois Natural History Survey, Champaign, USA; E-mail: meng.li167@uiuc.edu

Received date: 25 December, 2023, Manuscript No. JPPP-24-130375;

Editor assigned date: 28 December, 2023, Pre QC No. JPPP-24-130375 (PQ);

Reviewed date: 12 January, 2024, QC No. JPPP-24-130375;

Revised date: 19 January, 2024, Manuscript No. JPPP-24-130375 (R);

Published date: 26 January, 2024, DOI: 10.4172/2329-955X.1000323

Description

Brown Stem Rot (BSR) is a destructive fungal disease that affects soybean (Glycine max) crops worldwide. Caused by the fungus *Phialophora gregata*, BSR can lead to significant yield losses if not properly managed. The effects of Brown Stem Rot on soybeans and explore various control strategies to mitigate its impact will be discussed. Brown Stem Rot typically manifests during the reproductive stages of soybean growth, although symptoms may be visible earlier. Initial symptoms include interveinal chlorosis and wilting of leaves, which progress to brown discoloration and necrosis of the vascular tissues in the stem. The characteristic brown discoloration is most evident upon splitting the stem longitudinally, revealing dark brown to black lesions. Severe infections can result in lodging and premature plant death, leading to significant yield losses.

Brown Stem Rot interferes with the transport of water, nutrients, and sugars within the plant by colonizing the vascular tissues. As a result, affected plants experience reduced water and nutrient uptake, leading to stunted growth and decreased photosynthetic activity. Reduced photosynthesis limits the plant's ability to produce carbohydrates, impacting yield potential and quality. Severe BSR infections can cause pod abortion and reduced seed set, further compromising yield potential. Infected plants may exhibit symptoms such as pod shattering, empty pods, or undersized seeds, resulting in decreased grain quality and market value. Additionally, premature plant death due to BSR can prevent pods from reaching full maturity, leading to yield losses. Brown Stem Rot weakens soybean plants' immune response, making them more susceptible to secondary infections by other pathogens.

Opportunistic pathogens may exploit the weakened plant defense mechanisms, leading to additional damage and further exacerbating yield losses. Managing BSR effectively is essential to prevent secondary infections and maintain overall crop health. Rotate soybean crops with non-host crops such as corn or small grains to break the disease cycle and reduce inoculum build-up in the soil. Incorporate crop residues into the soil through tillage to accelerate decomposition and reduce the survival of BSR inoculum. Control weeds, particularly volunteer soybeans and other host plants, which can serve as alternative hosts for the BSR fungus. Select soybean varieties with genetic resistance to Brown Stem Rot. Plant breeders have developed cultivars with varying levels of resistance to BSR, offering an effective and sustainable means of disease management. Utilize Resistant Traits: Incorporate multiple resistance genes into breeding programs to enhance the durability of resistance and mitigate the risk of pathogen adaptation. Apply foliar fungicides containing active ingredients such as triazoles or strobilurins during periods of high disease pressure.

Foliar fungicides can suppress BSR development and reduce yield losses, especially in susceptible varieties. Use fungicidal seed treatments to protect seedlings from early infection and establish a healthy stand. Seed treatments provide systemic protection against soilborne pathogens, including *Phialophora gregata*. Implement an integrated approach that combines cultural practices, host resistance, and fungicide application to manage BSR effectively. Integrating multiple control measures can enhance disease control efficacy and reduce reliance on any single method. Monitor soybean fields regularly for early signs of BSR infection, such as leaf chlorosis and stem discoloration. Implement disease forecasting models and scouting protocols to assess disease risk and make informed management decisions.

Incorporate beneficial microorganisms such as mycorrhizal fungi or rhizobacteria into the soil to enhance plant growth and suppress soilborne pathogens. Beneficial microbes can promote soil health and antagonize BSR infection through competitive exclusion and induced systemic resistance. Maintain optimal soil organic matter levels through the addition of compost or organic amendments. Healthy soils with balanced microbial populations can suppress BSR development and support vigorous plant growth. Remove and destroy crop residues after harvest to reduce the survival of BSR inoculum in the field. Decomposing crop residues can serve as a reservoir for fungal spores, contributing to disease carryover into subsequent growing seasons. Clean and sanitize equipment, machinery, and storage facilities to minimize the spread of BSR spores between fields. Implement proper hygiene practices to prevent the inadvertent introduction and dissemination of BSR inoculum.

Brown Stem Rot poses a significant threat to soybean production worldwide, causing yield losses and reducing crop quality. Effective management of BSR requires a multifaceted approach that integrates cultural practices, host resistance, fungicide application, and integrated disease management strategies. By implementing proactive measures and adopting resilient cropping systems, soybean growers can minimize the impact of BSR and sustainably manage this challenging disease. Continued research, collaboration, and knowledge sharing are essential to develop innovative solutions and safeguard soybean crops against Brown Stem Rot in the face of evolving agricultural challenges.

Citation: *Li M (2024) The Effects of Brown Stem Rot in Soybeans and Control Strategies. J Plant Physiol Pathol 12:1.*