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Journal of
Plant Pathology & Microbiology

Editorial

An Editorial on Symptoms of Wheat Stem Rust

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EDITORIAL

Wheat stem rust, often known as black rust, is a serious disease that affects crops all over the world. *Puccinia graminis* subsp. *graminis* and *Puccinia graminis f.* sp. *tritici* are the bacteria that cause it. In the United States, the disease has been maintained under control thanks to a federal programme and breeding initiatives. In Africa and the Middle East, however, novel varieties of the stem rust pathogen have been discovered that are lethal on several of the resistance genes now employed in the United States. Stem rust can infect any part of the wheat plant's aboveground parts, and it's usually not discovered until after heading. From the stem and leaf tissue, pustules with red to orange spores erupt. The developing spores rip the leaf tissue, giving pustules their characteristic ragged appearance. On glumes and awns, pustules can also be seen. Stem rust is usually not discovered until after the plant has been headed. The stem rust pathogen produces spores that are darker in colour than those found in leaf rust and stripe rust.

Stem rust can infect any part of the wheat plant's aboveground parts, and it's usually not discovered until after heading. To survive, the stem rust pathogen requires living plant tissue. The disease does not overwinter in northern parts of the United States, thus urediniospores are transported north every year by wind currents from the south. Stem rust thrives under warm daytime temperatures (77-85°F), damp weather, and long periods of dew.

When ideal weather arrives, each stem rust pustule generates thousands of spores, which infect additional plants. If this cycle continues, sickness could quickly spread to epidemic proportions. Infection cycles continue until the host plant dies or if the weather is adverse. The time of spore migration and disease development is often a factor in yield loss.

Wheat types that are resistant to stem rust are available. Early planting of spring wheat can help prevent infection during grain fill, lowering disease burden. After harvest, destroy volunteer wheat and barley plants, as they act as a green bridge for spores in the southern United States. For stem rust, fungicides have been labelled. Varietal susceptibility, expected weather, and yield potential all impact the decision to employ a fungicide. Fungicides should be used as a preventative measure when necessary, and should be directed at the flag leaf.

Puccinia graminis f. sp. *tritici* causes stem rust (also known as black stem rust). It is mostly a wheat disease, but it can also produce mild infections in certain barley and rye cultivars.

Symptoms

Uredinia is characterised by oval lesions on the leaf sheaths, true stem, and spike. If other diseases haven't killed the leaves, Uredinia can appear on them. Uredinia are brick red in colour and can be observed rupturing the host epidermis. Uredinia normally penetrate both surfaces of the leaves to sporulate. Infected spots have a rough texture.

Environmental Conditions

Stem rust thrives under hot days of 25-30 degrees Celsius, mild nights of 15-20 degrees Celsius, and ample moisture for night time dews. Urediniospores can be effectively dispersed across long areas by the wind. Rain is required for successful urediniospores deposition in regional spore movement.

Survival

During the winter, when aeciospores are a primary source of inoculum, stem rust can persist as teliospores. During the non-wheat growing season, it usually survives as mycelium or Uredinia on volunteer wheat. Wind can transmit Urediniospores into disease-free areas. During the winter, sporulating Uredinia are active in tropical and subtropical locations. In more northern temperate climates, sporadic latent mycelium may thrive beneath the snow load.

Host Range

Stem rust is primarily seen in Triticum species, while naturally infected plants of *Secalecereale*, *Hordeumvulgaris*, *Hordeum jubatum*, *Hordeum pusillum*, and *Elymus junceus* have been observed. When intentionally inoculated, many genera of the Hordeae tribe get affected. Other *P. graminis* formae specialis attack a wide range of cereals and related grasses, and many species are susceptible to multiple formae specialis.

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Received: October 20, 2021; **Accepted:** October 25, 2021; **Published:** October 30, 2021

Citation: Vennam S (2021) An Editorial on Symptoms of Wheat Stem Rust J Plant Pathol Microbiol. 12: 582