

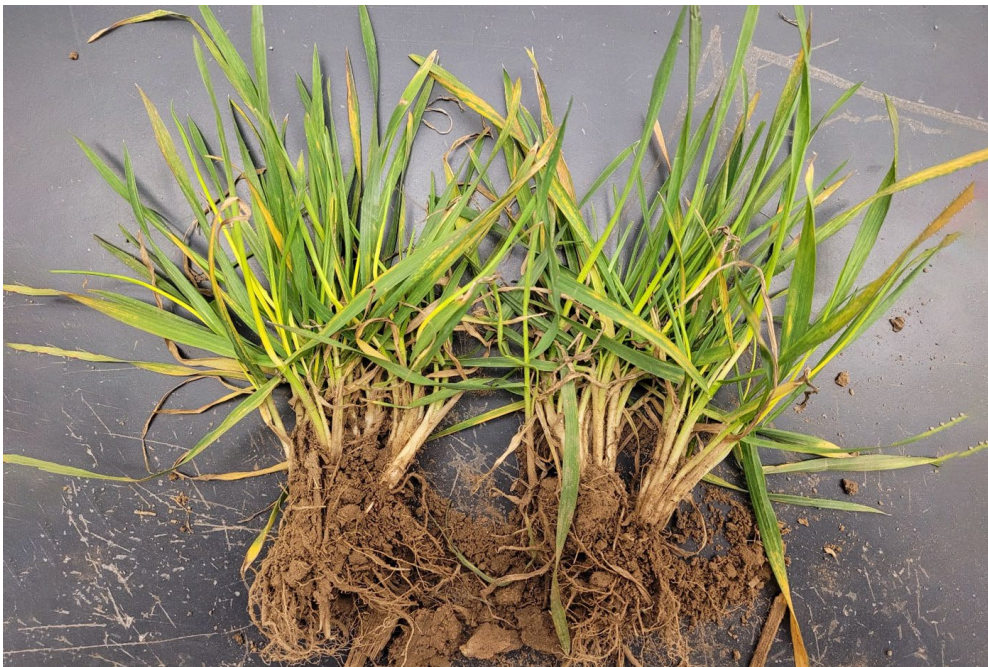
Wheat Spindle Streak Mosaic Virus & Soil-borne Wheat Mosaic Virus



Pierce Taylor and Peng Tian

MU Plant Diagnostic Clinic

Both Wheat Spindle Streak Mosaic Virus (WSSMV) and Soil-borne Wheat Mosaic Virus (SBWMV) are soil-borne viruses that infect wheat and other cereal crops, causing significant yield losses in many parts of the world. As the name suggests, SBWMV is primarily transmitted through soil, either through direct contact with infected plant debris or via soil-dwelling vectors like *Polymyxa graminis*, a fungus-like organism that can spread the virus to new plants.



Symptoms of WSSMV and SBWMV infection can vary depending on the strain of the virus and the stage of plant growth, but can include yellowing, mosaic or mottling patterns on the leaves, stunted growth, and reduced grain quality. WSSMV can cause light green to yellow spindle-shaped streaks and necrosis of leaves, reduced heading, and slight stunting while the symptoms of SBWMV are chlorotic mosaic or irregular mottling and streaking, and even resetting in some very susceptible cultivars. Symptoms are most prominent on early-spring growth and rarely appear in the fall. The severity and distribution of the symptoms in the field depends on the activity of the fungus which inhabits low-lying wet areas. *Polymyxa graminis* can produce zoospores that can carry the viruses and swim in the soil, transmitting diseases among plants while the fungus parasitizes the roots. Therefore, soil wetness as well as the temperature are crucial in disease incidence. Prolonged cool and wet conditions in the spring

assists the development of symptoms while the symptoms may disappear as the temperature increases in the late spring or summer and the plants may recover eventually.

The fungus remains infective in the soil for more than five years. Therefore, preventative measures such as crop rotation and use of certified virus-free seed are important for managing the disease. There are wheat varieties available with resistance to one or both of the diseases. Be sure to test the wheat plants showing viral symptoms through plant diagnostic clinic and check the resistance of varieties to be used.

WSSMV and SBWMV are serious threats to wheat production, particularly in areas with cool, wet soils where the virus and its vectors can thrive. Vigilant monitoring and management practices are essential for minimizing the impact of the disease.

Reference:

Cadle-Davidson, Lance, and S. M. Gray. "Soilborne wheat mosaic virus." The Plant Health Instructor (2006).

Slykhuis, John T. "Virus and virus-like diseases of cereal crops." Annual Review of Phytopathology 14, no. 1 (1976): 189-210.

Washington State University. "Soilborne Wheat Mosaic" <https://smallgrains.wsu.edu/disease-resources/virus-diseases/soilborne-wheat-mosaic/>

Anna Freije, Gail Ruhl, and Kiersten Wise. "Wheat Virus" Purdue University Extension BP-146-W.