

# Barley Yellow Dwarf Disease of Wheat

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In Missouri, barley yellow dwarf (BYD) is a disease that can infect a wide range of cereal crops, primarily barley, wheat, oats, and rye. The disease is a significant threat to cereal production worldwide, with estimated losses of up to \$1 billion annually, causing yield loss between 11% and 33% and sometimes up to 80% (Miller and Rasochová 1997). Viruses that cause this disease are commonly referred to as barley yellow dwarf virus (BYDV), maize yellow dwarf virus (MYDV) and cereal yellow dwarf virus (CYDV) and belong to different genera in the same family Luteoviridae (Walls III et al). This disease primarily spread by over 20 types of aphids, which feed on infected plants and then transmit the virus to healthy plants as they move between fields. Symptoms of infection includes yellowing or reddening of leaves, stunted growth, and reduced yield and quality and can vary depending on the crop and the severity of the infection. Vigilant monitoring and management practices are essential for minimizing the impact of the disease on farmers and food security.

Typically, BYD disease causes discoloration at the leaf edges and midrib before the leaf tip. Leaves become light green or yellow and may have apparent purple staining. Plant growth may become stunted or have a rigid upright growth form due to BYDV. Symptoms are most apparent between 50°F and 65°F. The size and distribution of these symptoms is associated with the feeding activities of aphids. Plants that are symptomatic in fall or early spring suffer greater yield losses. Late spring or summer infections can cause yellowing of the upper leaves, but generally there is minimal stunting or yield loss.

## **Management of BYD disease of Wheat:**

There is currently no known cure for BYD, but genotype, environmental stress, plant age at the time of infection, and the plant general health will all play a role in how the disease impacts yield and grain quality. To reduce the spread of the virus, preventative measures such as planting less susceptible varieties, controlling aphid populations through insecticides or cultural practices, and planting when aphid populations are low are necessary. Researchers are also working on developing new strategies for managing viral diseases in cereal crops, including using RNA interference to silence viral genes and prevent replication.

## **Reference:**

Miller and, W. Allen, and Lada Rasochová. "Barley yellow dwarf viruses." *Annual review of phytopathology* 35, no. 1 (1997): 167-190.

Walls III, Joseph, Edwin Rajotte, and Cristina Rosa. "The past, present, and future of barley yellow dwarf management." *Agriculture* 9, no. 1 (2019): 23.