Bacterial Leaf Streak in Wheat Varieties Adapted to South Dakota

David Karki, Assistant Professor & SDSU Extension Crop Production Specialist
Gazala Ameen, Assistant Professor SDSU Agronomy, Horticulture and Plant Science
Madalyn Shires, Assistant Professor & SDSU Extension Plant Pathology Specialist
Karl Glover, Professor, SDSU Agronomy, Horticulture and Plant Science
Sunish Sehgal, Professor, SDSU Agronomy, Horticulture and Plant Science
Dalitso Yabwalo, Research Associate, SDSU Agronomy, Horticulture and Plant Science

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Introduction

Bacterial leaf streak (BLS) is considered the most devastating bacterial disease of wheat and is one of the economically important diseases overall. In experiments conducted in controlled environments (greenhouse, disease nursery), susceptible varieties have shown yield losses in the range of 40% to 60%. However, in field conditions yield losses in the range of 10% to 30% can be expected during wet seasons. The disease also reduces grain quality by causing discoloration on the spikes and is known as black chaff. Other small grain crops such as barley and oats are known to be affected by BLS as well.

The BLS of wheat is caused by Xanthomonas translucens pv. undulosa. It is a seed-borne disease but can also survive on volunteer wheat and grassy weeds. The disease spreads through rain and wind during the growing season. Warm and humid conditions and overhead irrigation increase prevalence in the field. Plants or leaves that are already injured by hail or strong winds are more susceptible to BLS.

Symptoms

Early symptoms appear as irregular, translucent, water-soaked streaks on leaves, often accompanied by a shiny glaze or milky bacterial exudate in humid weather. These streaks may turn yellow and then brown, eventually becoming necrotic. In severe cases, lesions can coalesce to affect the entire leaves. The BLS affects spikes causing black chaff characterized by dark brown to black discoloration on glumes, peduncles, and rachis, which reduces grain quality and harbor the bacteria. Symptoms are most evident after the flag leaf stage and during grain fill.

Figure 1. Wheat spike infected with BLS. (Courtesy of Gazala Ameen, SDSU)

Figure 2. Wheat leaf infected with BLS. (Courtesy of Gazala Ameen, SDSU)

Figure 3. Wheat plot infected with BLS. (Courtesy of Gazala Ameen, SDSU)

Management Strategies

1. Resistant or tolerant cultivars: As there are no chemical product labeled and no biologicals to control BLS, selection of resistant or tolerant varieties is the best way to manage the disease. In recent years, plant pathologists at South Dakota State University have started evaluating commercially available wheat varieties that are tested in Crop Performance Testing (CPT) program for BLS tolerance. Table 1. Provides disease tolerance scores against BLS.

2. Clean Seed: BLS is primarily spread by infected seed and planting certified, disease-free seed is critical to manage the disease.

3. Volunteer plant control: Controlling volunteer plants and grassy weeds around the field can significantly reduce the disease pressure.

Table 1. Bacterial Leaf Streak (BLS) tolerance scores of winter and spring wheat varieties grown in disease nursery near Volga, SD. Varieties are sorted according to tolerance to BLS.

Winter Wheat Variety	Mean BLS Score 2025	Category
CP7050AX	2	R
SD Andes	2	R
SD Midland	2	R
AP Bigfoot	2	R
SD Pheasant	2	R
CP7017AX	2	R
LCS Steel AX	2	R
SD Vivian	3	MR
MS Maverick	3	MR
LCS Warbird AX	3	MR
WB4422	3	MR
WB4540	3	MR
AP Sunbird	3	MR
CP7266AX	3	MR
LCS Radar	3	MR
AP Clair	4	MR
LCS Julep	4	MR
AAC Vortex	4	MR
CP7909	4	MR
LCS Aries	4	MR
AP 24AX	4	MR
Ideal	5	MS
LCS Helix AX	5	MS
Winner	5	MS
Kivari AX	5	MS
Draper	5	MS
Expedition	5	MS
LCS Mojo	5	MS
CP7869	6	MS
Crescent AX	6	MS
CP7462	6	MS
CP7319AX	7	S

Spring Wheat Variety	Mean BLS Score 2023-25	Category
LCS TRIGGER	2	R
ASCEND-SD	3	MR
BRAWN-SD	3	MR
DRIVER	3	MR
MN-TORGY	3	MR
ENHANCE-SD	4	MR
LCS DUAL	4	MR
MN-ROTHSAY	4	MR
MS COBRA	4	MR
MS NOVA	4	MR
SURPASS	4	MR
CP3188	5	MS
LCS ASCENT	5	MS
LCS BOOM	5	MS
LCS BUSTER	5	MS
LCS CANNON	5	MS
MS CHARGER	5	MS
SY VALDA	5	MS
ND STAMPEDE	6	MS
WB9590	6	MS
LCS HAMMER AX	7	S
ND Horizon	5 (2025)	MS
AP DAGR	-	-
AP ELEVATE	-	-
AP ICONIC	-	-
CP3055	-	-
CP3119A	-	-
CP3555	-	-
ND Roughrider	-	-

Disease ratings: 1 (no disease) to 9 (severe disease); R, resistant; MR, moderately resistant; MS, moderately susceptible; S, susceptible.

Suggested Reading

Strunk, S., H. Buyung. 2012. Wheat Diseases in South Dakota. In: D.E. Clay, C.G. Carlson, and K. Dalsted, Best Management Practices for Wheat Production.

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