



**SOUTH DAKOTA STATE  
UNIVERSITY EXTENSION**

Barley Yellow Dwarf Virus (Juliette Marshall Marshall, Bugwood.org)

# **Grass Diseases of South Dakota Identification Guide**

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# Common Grass Diseases

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## INTRODUCTION

Diseases of cereal crops, grass hay, and pastures are detrimental to crop production, feed quality, plant health, and livestock well-being. Plant health should be prioritized for the purposes of yield, economic sustainability, environmental preservation, and overall livestock vigor. Diagnosing and managing grass borne diseases is key to maximizing overall crop production.

Multiple bacterial, fungal, and viral diseases have been on the rise in recent growing seasons. Disease pressure has heightened in several field settings, but proper identification tools and skills can be harnessed to reduce disease intensity, occurrence, and transmission.



## BACTERIAL BLIGHT

Bacterial blight is a common disease that threatens multiple hosts including sorghums, johnsongrass, oats, wheat, bromegrass, barley, rice and other common grasses. It is caused by bacteria including *Pseudomonas sringae* and *Xanthomonas campestris*.

Disease onset begins as small oval lesions develop. Typically, infected areas have a water-soaked appearance. Lesions turn necrotic with chlorotic margins. Eventually, lesions merge to form large and linear brown patches. Ooze may emerge from infected areas as well. Bacterial blight can present itself as leaf stripe, leaf streak, and eyespot.



Figure 1. Bacterial streak with water-soaked lesions and ooze (Mary Burrows, Montana State University, Bugwood.org)



Figure 2. Advanced bacterial streak in wheat (Emmanuel Byamukama, South Dakota State University, Bugwood.org)

Bacteria can spread by moving water, wind, and insects. Unfortunately, the disease can overwinter in residues, the soil, and within seeds as well. They can enter natural openings within plant tissues including stomata, hydathodes, and wounds.

To prevent bacterial blight, resistant cultivars should be utilized. There are few chemical interventions that are successful at diminishing bacterial blight. However, copper-based bactericides have shown some successes at prevention. Grass crops should be rotated with broad leaf alternatives for 2 years if the disease emerges. Herbicides should be applied to keep alternative hosts at bay. If necessary, controlled burns can be effective at reducing overwintering materials and residues. It is important to mention that grass cuttings should be done early when crops are infected to reduce the inoculum and further spread.

## BARLEY YELLOW DWARF

Barley yellow dwarf is caused by the most common cereal crop virus, barley yellow dwarf virus (BYDV). The primary hosts of barley yellow dwarf include barley, wheat, rye, oats, and even maize.

As its name suggests, barley yellow dwarf virus is most notably identified by the distinct yellowing it causes at the tips of leaves. Typically, symptoms of BYDV begin to develop at the jointing stage. This yellowing begins as general chlorosis and can turn to shades of purple and red. BYDV is commonly confused with wheat streak mosaic virus (WSMV), but BYDV lacks the level of yellow streaking that WSMV causes. Generally, BYDV does not infect an entire field but rather causes symptoms in smaller patches.



Figure 3. Yellowing symptoms of BYDV compared to healthy plant in barley (Keith Weller, USDA Agricultural Research Service, Bugwood.org)



Figure 4. Red and purple discoloration associated with BYDV (NAR RANABHAT, Kansas State University, Bugwood.org)

BYDV can spread rapidly as it is transmitted by aphid vectors. There are over 20 species of aphids that can transmit the virus. The most common vectors include the oat bird-cherry aphid, the English grain aphid, the corn leaf aphid, and the greenbug. Infection often occurs during cool and moist conditions. Aphids can be blown with the wind for miles, leading to randomized infection. BYDV survives in volunteer crops and the aphid vectors. Therefore, in the fall when volunteer crops germinate aphids can spread the disease from the pre-existing crop. Crops that are planted in the fall, such as winter wheat, can then be infected and carry the infection into the spring. These same aphids can undergo overwintering where they appear in the following spring season as well. When optimal moist and cool conditions (50° F - 65° F) occur, aphid movement and BYDV transmission increase.

Unfortunately, it is rather difficult to control and manage BYDV. However, there are a couple of resistant varieties that can be utilized – this only accounts for a few species of the virus. There should be adequate time given between harvesting small grains and planting winter crops in the fall to avoid aphid infection from pre-existing crops. Follow your local guidelines for planting dates, and do not plant them before the recommended timings. For example, barley should be planted late in the fall, and oats should be planted early in the spring. Plants that have greater maturity will be less susceptible compared to younger plant tissues. Volunteer crops and alternative hosts should be properly eradicated to reduce fall transmission and overwintering of the virus. Herbicide application and tillage are options for reducing volunteer infection and transmission. Foliar insecticides or insecticide seed treatments may be optimal for aphid control. Seed treatments such as imidacloprid or thiamethoxam may be applied in the fall in aphid dense areas.

## ERGOT

Ergot is a fungal disease that is heavily prevalent in over 400 grasses. It is caused by *Claviceps purpurea*. It is important to mention that the most susceptible grain to ergot is rye. Ergot forms dark melanized structures on the fruiting bodies called sclerotium, which protect them from ultraviolet radiation. Ergot produces alkaloids which are toxic to both humans and livestock. This can be dangerous when consumed as it causes Ergotism. Ergotism will lead to reduced blood flow, and in severe conditions, gangrene and tissue death in animals. If ergot is consumed by humans' hallucinations, gastric issues, and loss of appendages can occur.

Ergot infects grasses at the flowering stage of the plant only. Sclerotia, which fell from infected plants in the previous season, are the black fruiting bodies that overwinter in the soil and germinate in the spring. When they germinate, they release ascospores which infect individual florets on the grass. Once the plant is infected, the florets create a honey dew substance that is visible; it is a wet sugary substance that attracts insects. Within the honey dew is the asexual spore, conidia, which is then transmitted by any insect to other flowering grasses. Following the production of honey dew, sclerotia develops later in the season on the individual florets infected. There are no other identifiable symptoms besides yield reduction.



Figure 5. Ergot presence in perennial ryegrass (William M. Brown Jr., Bugwood.org)



Figure 6. Ergot presence in rye (Bruce Watt, University of Maine, Bugwood.org)

The development of ergot is most favorable in moderate temperatures (60° F - 80° F) and moist conditions. Sclerotia will germinate with the aid of some moisture in the spring when temperatures are lower. If grasses are flowering at the time of these optimal conditions, then infection will spike. If grasses are being used for feeding, one should scout for ergot prior to cutting. If grasses are not being used for grain, they should be harvested before heading to bypass ergotism concerns overall. If heading or flowering does not occur, then there are no concerns for ergot period.

There are few cultural controls that can be applied to diminish ergot. Utilizing partial resistant varieties is key to reducing infection. Crop rotation with non-susceptible hosts for several years can be helpful. Unfortunately, ergot can survive in the soil for up to three years. Planting ergot free seed is a major priority to limiting ergot spring germination. In some cases, controlled burning can also kill off exposed sclerotia. Chemical controls such as fungicide application of group 11 and, or group 3 can be applied. Be sure to reference local fungicide recommendations if you are experiencing ergot in your fields.

## FAIRY RING

Fairy ring disease is rather common on turf and lawns, and it is caused by a variety of basidiomycete fungi. The soil borne fungi feed on organic matter within the soil. The fungi are composed of mycelium which grow outward giving the notorious circular appearance. The prominent ring formed by the fungus is typically darker than the neighboring grass. It causes the grass above it to grow rapidly due to the excess of nutrients it creates. During moist conditions, mushrooms may grow from the ring. These mushrooms are fruiting bodies which create spores that spread the fungus.

There can be singular rings on a lawn, or multiple in different areas. The rings can be a few inches in diameter or multiple feet. These rings can come back year after year, but they can also randomly disappear. As mentioned, the ring is typically a darker green color. This is due to the excess nitrogen created as the fungus decomposes organic matter.



Figure 7. Fairy ring development with fruiting bodies absent (Lee Miller, University of Missouri, Bugwood.org)



Figure 8. Fairy ring with fruiting bodies (William M. Brown Jr., Bugwood.org)

There are three common types of fairy rings that we see. The first is one that occurs specifically on putting greens at golf courses. This type of fairy ring blocks water adsorption leading to brown fairy rings that represent drought-like conditions. The second type uses the fungi in a beneficial way allowing for nutrient accumulation, creating a dark green ring. The second type typically occurs on home lawns. The third type produces mushrooms in the fall when the soil is saturated. This third type also typically occurs on home lawns.

Since this disease affects homeowners and turf productions rather than typical field crop production, management looks a little bit different. In some cases, it is best to let the fairy ring disappear on its own, particularly if the aesthetic of the lawn is not a concern. However, control measures such as core aeration can loosen up compacted dead organic material. If you are facing issues with dark green fairy rings, nitrogen can be applied in areas to match the lighter grass to the darker grass. If mushroom development occurs, they can be removed by hand and disposed to prevent further spread. It is important to wear protection if you are touching the mushrooms as some may be poisonous. There are few fungicides that can be applied in accordance with aeration; however, professional help should be utilized as many fungicides are not effective.

## HELMINTHOSPORIUM LEAF SPOT

This leaf spot disease is caused by fungus called *Helminthosporium*. This disease affects cool seasonal grasses like Kentucky bluegrass, tall fescue, and perennial ryegrass. It is important to note that this fungus is not only in turf grasses, but also causes Victoria blight of oats, net blotch of barley, and southern corn leaf blight as well. *Helminthosporium* is a saprophyte, meaning it feeds on dead organic matter.

The most common symptom of this disease is leaf spots with a red border and gray center. The spots may be a pin prick in size or larger and elongated. They can be found on the leaves, sheath, and crown of the plant. Infected leaves will begin to yellow and die off over time.



Figure 9. Helminthosporium Leaf Spot (Rui map Zheng, Bugwood.org)



Figure 10. Helminthosporium Leaf Spot (William M. Brown Jr., Bugwood.org)

This disease overwinters in the thatch, or dense organic matter beneath grass. The fungi become active in cool (60° F - 65° F) and wet conditions. Disease intensity increases with prolonged leaf wetness but can also be severe during times of stress such as drought. Areas that are too high or even too low in nitrogen will also have increased disease incidence.

In conventional grain crops, the disease can be controlled by rotating crops and applying tillage between seasons. Fungicides can also be applied such as group 3, group 3 and 7, group 3 and 11, and group 3, 7, and 11. In turf grass productions, there are many applicable fungicides that can be used as protectants. It is also important to apply the correct amount of nitrogen and keep nutrients at optimal levels. Grass should be watered in the morning, and afternoon and evening watering should be avoided. When mowing, the equipment should be cleaned and maintained. Avoid cutting the grass height below 2.5 inches. Most importantly, resistant turf seed cultivars are available, and they should be planted in areas of concern.

## POWDERY MILDEW

Powdery mildew is caused by *Blumeria graminis*, a fungal pathogen. This disease can overwinter on crop residues, making it problematic year after year. In severe cases it can decrease yields by ¼. This is a very common disease in turfgrass and ornamentals as well.

It is most notable for its white powdery growth found on both sides of leaves, on the stem, and crown of plants. This white growth is the physical pathogen made of mycelium. Symptoms onset with small chlorotic patches that then form the white fluffy growth, followed by small black overwintering structures. When symptoms are severe, plant growth and development are delayed, plants are stunted, and yield is reduced. Once the flag leaf in cereals is compromised by the fungus, yield loss should be expected.



Figure 11. Powdery mildew on the crown of wheat (Mary Burrows, Montana State University, Bugwood.org)



Figure 12. Dense powdery mildew with black overwintering structures (Mary Burrows, Montana State University, Bugwood.org)

Disease is most prominent in high humidity and moderate temperatures (60° F - 70° F). Thick monocultures with high seeding populations are more susceptible to disease spread, especially in moist environments. Disease onset occurs early in the season on new and emerging plant tissues. In warmer environments, powdery mildew will begin to die off. Therefore, the spring is when powdery mildew incidence often reaches its peak.

There are successful fungicides used to prevent and cure susceptible plants, such as Prostaro. It may be beneficial to reduce population size, as it will lower disease transmission across fields. Volunteer plants and alternate hosts should be eliminated with herbicides. Rotating between non-susceptible crops will reduce spring inoculum as well. Whenever possible, resistant varieties should be utilized! There are multiple resistant varieties that can be planted.

## LEAF RUST

Leaf rusts occur in all cereal crops, but they are caused by different fungal strains. For example, wheat leaf rust is caused by the fungus *Puccinia triticina*, while barley leaf rust is caused by the fungus *Puccinia hordei*. Therefore, even though both diseases cause leaf rust, they cannot cross-infect hosts or other cereals. Symptoms are very similar across the cereal crops when infected with leaf rust.

Orange and red pustules emerge across the upper side of leaf surfaces. They begin as scattered pustules, but they may cluster and merge. As the disease progresses, the pustules turn from a bright orange color to a black spot. This black spot typically emerges on the underside of the leaf. These structures are filled with teliospores but are generally not of concern. If severe enough, rusts can lead to 20% yield decreases.



Figure 13. Wheat leaf rust (Thirunarayanan Perumal, Banaras Hindu University, Bugwood.org)



Figure 14. Barley leaf rust (Donald Groth, Louisiana State University AgCenter, Bugwood.org)

Leaf rust must have a living host as it is an obligate pathogen. This disease, therefore, does not have the ability to overwinter. Instead, it is transmitted by the wind from southern regions; urediniospores move from the south and infect northern crops. Like most diseases, rusts thrive in high humid conditions. For leaf rust, temperatures of 65° F - 77° F create optimal conditions. Once established in a field, this disease can continually be reproduced until the crop is harvested.

It is important to note the differences between leaf rust, specifically in wheat. There is wheat leaf rust, and wheat stripe rust. Both diseases are established on the leaves. However, rather than randomized pustule development, wheat stripe rust develops pustules in a line across the leaf. These are two separate diseases.

The use of resistant varieties is the best way to avoid this disease. However, broken resistance has been found in some varieties. It may be helpful to use varieties that reach maturity earlier to avoid the migration of urediniospores from the south. Otherwise, there are multiple fungicides available including foliar applications and seed treatments.

## STEM RUST

Stem rust is typically associated with wheat, but it can also infect barley, oats, rye, and general grasses. Across all grasses, this disease is caused by a fungus called *Puccinia graminis*. However, each host has its own form of rust. Therefore, wheat stem rust cannot infect any other primary host, just as oat stem rust cannot infect any other primary host as well. Stem rust has a complicated disease cycle as it requires an alternate host to complete its life cycle. In wheat, the primary host is wheat; however, it must then infect barberry plants to successfully reproduce. In a similar manner, oat stem/crown rust requires buckthorn as its alternate host.

The name suggests that this disease only occurs on the stem of a plant; however, leaves are susceptible too. The leaves and leaf sheaths of the primary host become infected with uredinia which are visible as round and blocky orange pustules. These uredinia turn a dark color later in the season as they develop telia. These telia can overwinter. In the springtime, residues that contain telia germinate and release basidiospores. These are the spores that infect the alternate host. In wheat stem rust, the basidiospores infect a barberry plant. The barberry plant will later release aeciospores which infect the primary host, causing the cycle to repeat. Disease spread comes from overwintering teliospores as well as wind disseminated urediniospores and aeciospores.



Figure 15. Wheat stem rust (Thirunarayanan Perumal, Banaras Hindu University, Bugwood.org)



Figure 16. Oat stem rust (Howard F. Schwartz, Colorado State University, Bugwood.org)

Unfortunately, yield losses can be severe with 50-70% reductions. If disease onset occurs before grain fill, yield implications will evolve. This is due to shrunken kernels and poor tiller growth. Stem rust thrives in warm (77° F - 86° F) and moist conditions.

Preventative strategies include the use of resistant cultivars for all cereal crops. Fungicides and seed treatments are available as well. Crop rotation with non-grasses is also helpful. Be sure to eliminate any neighboring alternate hosts with herbicides.

## SEPTORIA BLOTCH

Septoria blotch can be found in most grasses. It is a fungal disease caused by *Zymoseptoria tritici* (in wheat). Typically, this blotch is not of utmost concern. However, if it infects a head before kernel formation it can cause poor kernel fill and decreased yields.

Symptom onset begins as small chlorotic circles, but they will gain dark tan and orange coloring. Lesions will begin to elongate and become elliptical in shape. At the center of the lesions are small black fruiting structures that can be seen with the eye. Blotch can also affect the glumes of the grass, causing discoloration. Typically, disease starts at the base of the plant and works its way upwards in accordance with environmental conditions. This disease can be easily confused with Stagonopora blotch, so it is important to look at the lesion shape, fruiting bodies, and confirm it microscopically.

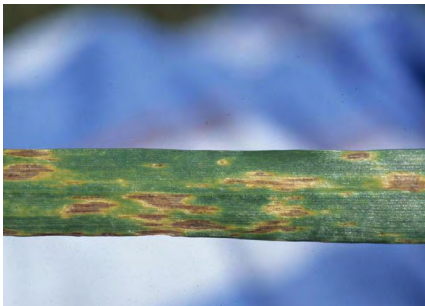


Figure 17. Septoria blotch in wheat (Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org)

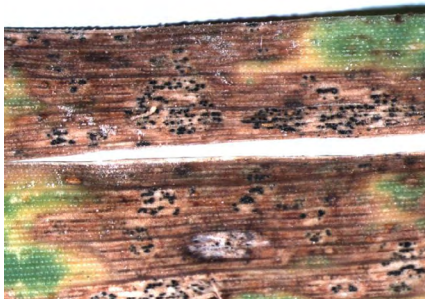


Figure 18. Septoria blotch fruiting structures (Louisiana State University AgCenter, Bugwood.org)

Infections typically develop in the fall from previous residues hosting the fungus. Optimal conditions for infection are cool (60° F - 70° F) and wet environments. Extended leaf moisture will increase disease prevalence and rainy conditions will transmit the disease quickly. It takes just less than a month for the disease to spread new spores to neighboring hosts. The blotch will make its way up the plant to the head in severe cases.

Like most diseases, it is very important to plant resistant varieties, especially if symptoms were found in the past seasons. Foliar fungicides are available as a preventative strategy. Fungicides should be applied to prevent infection at the top portion of the plant, specifically the flag leaf. Seed treatments can be used, but they are not fully preventative. If septoria blotch is a repeating problem, grasses should be avoided, and non-host crops should be planted.

## STAGONOSPORA BLOTCH

Stagonospora leaf and glume blotch (SB) are caused by the fungus *Parastagonospora nodorum*. This fungus is common in most cereal crops, particularly in wheat, barley, and rye. This fungus causes purple discoloration on glumes and purple leaf spots and blotch on leaves. That being said, all portions of the plant are susceptible to infection. Symptoms of leaf blotch typically begin following flowering; once kernels begin to fill, glume blotch will also develop.

Glumes will begin to develop a dark purple discoloration, which will turn into a black color at the end of the season. Where lesions develop on both the tillers, stem, leaves, and glumes; dark fruiting bodies will form, releasing spores. Infected plants will lead to reduced yield and lowered test weights. This is due to infected kernels shriveling from the disease.



Figure 19. Stagonospora Leaf Blotch symptoms (Cesar Calderon, Cesar Calderon Pathology Collection, USDA APHIS PPQ, Bugwood.org)



Figure 20. Stagonospora Glume Blotch symptoms (Craig Grau, University of Wisconsin-Madison)

SB typically begins at the base of the plant and works its way upwards. As warm weather (68° F - 85° F) and humid conditions increase, so does disease progression. Rain is a primary factor in disease spread, as it splashes spores from the lower canopy; it distributes them to neighboring plants. The fungus can overwinter in plant debris, spreading infection in the following season.

To control SB, resistant varieties should be utilized along with pathogen-free seeds. Since plant debris carry the pathogen into the following year, crop rotation with non-grasses should be employed. Fungicides are also available for SB, and they should be applied at flag leaf emergence, Feekes 8-9. Fungicide-treated seeds are also available in areas of concern. Similar to other diseases, lowering population density may also be productive at slowing disease spread.

# REFERENCES

## **Bacterial Blight**

<https://ipm.illinois.edu/diseases/rpds/315.pdf>

<https://www.vegetables.cornell.edu/pest-management/disease-factsheets/do-rotations-matter-within-disease-management-programs/>

## **Barley Yellow Dwarf:**

<https://utcrops.com/wheat/bydv-barley-yellow-dwarf-virus/>

<https://ohioline.osu.edu/factsheet/plpath-cer-01>

<https://cropwatch.unl.edu/plant-disease/wheat/barley-yellow-dwarf/>

## **Ergot:**

<https://pnwhandbooks.org/plantdisease/host-disease/grass-seed-ergot>

<https://cropprotectionnetwork.org/publications/ergot-six-things-to-be-mindful-of-with-ergot-in-small-grains-and-grasses>

## **Fairy Ring:**

<https://web.extension.illinois.edu/hortanswers/detailproblem.cfm?PathogenID=183>

<https://hort.extension.wisc.edu/articles/fairy-rings/>

## **Helminthosporium leaf spot:**

<https://hort.extension.wisc.edu/articles/helminthosporium-turf-diseases/>

<https://content.ces.ncsu.edu/leaf-spot-in-turf>

<https://pnwhandbooks.org/plantdisease/host-disease/oats-avena-sativa-leaf-blotch-crown-rot-helminthosporium-leaf-blotch>

<https://plantpath.caes.uga.edu/content/dam/caes-subsite/plant-pathology/extension-pdfs/PDL-fungi-helminthosporium.pdf>

## **Powdery mildew:**

[https://www.pioneer.com/content/dam/dpagco/pioneer/na/ca/en/files/articles/DF-Powdery-Mildew-of-Cereals\\_NA\\_CA\\_EN\\_V1.pdf](https://www.pioneer.com/content/dam/dpagco/pioneer/na/ca/en/files/articles/DF-Powdery-Mildew-of-Cereals_NA_CA_EN_V1.pdf)

<https://www.cropscience.bayer.us/articles/cp/powdery-mildew-in-cereal-crops>

## **Leaf rust:**

<https://pnwhandbooks.org/plantdisease/host-disease/barley-hordeum-vulgare-leaf-rust>

<https://agriculture.vic.gov.au/biosecurity/plant-diseases/grain-pulses-and-cereal-diseases/leaf-rust-of-wheat>

<https://cropprotectionnetwork.org/encyclopedia/leaf-rust-of-wheat>

**Stem rust:**

<https://www.apsnet.org/edcenter/pdlessons/Pages/StemRust.aspx>

<https://www.ars.usda.gov/midwest-area/stpaul/cereal-disease-lab/docs/cereal-rusts/wheat-stem-rust/>

<https://www.ars.usda.gov/midwest-area/stpaul/cereal-disease-lab/docs/cereal-rusts/oat-crown-rust/>

**Septoria blotch:**

<https://www.plantpath.k-state.edu/extension/wheat-and-forages/documents/septoria-tritici-blotch.pdf>

<https://cropprotectionnetwork.org/encyclopedia/septoria-tritici-blotch-of-wheat>

**Stagonospora Blotch:**

<https://cropprotectionnetwork.org/encyclopedia/stagonospora-leaf-and-glume-blotch-of-wheat>

[https://pddc.wisc.edu/wp-content/blogs.dir/39/files/Fact\\_Sheets/FC\\_PDF/Leaf\\_and\\_Glume\\_Blotch\\_of\\_Small\\_Grains.pdf](https://pddc.wisc.edu/wp-content/blogs.dir/39/files/Fact_Sheets/FC_PDF/Leaf_and_Glume_Blotch_of_Small_Grains.pdf)

<https://extension.purdue.edu/extmedia/BP/BP-144-W.pdf>

