

Managing common leaf diseases in wheat

Managing leaf (or foliar) diseases is critical for Michigan growers who have their sights on improving wheat yields. These fungal diseases can cause losses beginning in the early vegetative stages and extending through grain-fill.

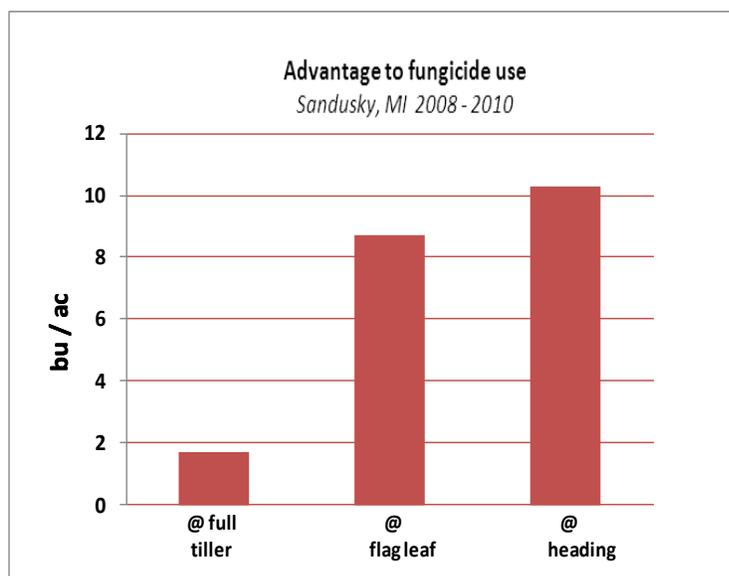
Varietal resistance is the first line of defense against diseases. MSU’s Wheat Performance Trial Report provides information on each variety’s susceptibility to common foliar diseases (www.css.msu.edu/varietytrials/wheat/). Cultural practices affect the development of diseases as well. For example, planting wheat following a small cereal grain can encourage fungal disease development. In addition, excessive rates of fertilizer nitrogen can lead to overly dense, lush stands that tend to encourage leaf diseases.

Fungicide applications are often cost effective where: 1) the variety is susceptible to the disease(s); 2) the disease is found at a relatively high level; 3) a damp weather pattern is predicted; and 4) the crop has a high yield potential. The current fungicides available for wheat and their relative effectiveness are provided in table 1.

When attempting to manage wheat diseases, the priority should be to protect the flag leaf. This can usually be achieved by applying a fungicide from the time the flag leaf emerges until early flowering. Strategically, there is an advantage to waiting until the tail-end of this window when the first flowers appear, as this can be effective timing for an application that targets both leaf diseases and Fusarium head scab. Where this strategy is employed, growers should select between the most effective fungicides for head scab (Table 1). Based on research in Michigan, this early flowering application often results in yield boosts of 5 bu/ac or more due to suppressed leaf disease pressure.

Some growers are inclined to also use a fungicide at full-tillering. This early application is usually not warranted. The exception may be where there are lush stands of a powdery mildew susceptible variety, and where the grower can avoid an extra trip across the field by adding the fungicide to a planned herbicide application.

This chart illustrates the average yield response to fungicide use across three years and five varieties in Michigan’s Thumb region. The results suggest that applications at flag leaf or early flowering were most effective in protecting the flag leaf and, consequently, grain yield.



Powdery mildew is the most common leaf disease of wheat. It also tends to be the earliest to appear in the spring, though it is capable of eventually spreading to the flag leaf and even the heads if conditions remain favorable. The disease is favored by wet and cool temperatures (59 to 72°F), and humidity above 85 percent.

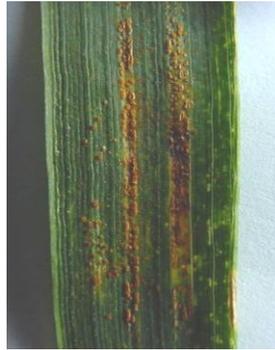
Septoria leaf spot first appears as tiny yellow flecks on the lower leaves. It expands to become angular, tan to brown lesions containing black specks (pycnidia). Septoria is usually prevalent early in the season preferring cool temperatures (50-68°F). Wet and windy conditions also favor the disease.

Stagonospora leaf blotch has lesions similar to Septoria leaf spot, except they tend to be more lens-shaped, may have yellow halos, and its pycnidia are browner in color. Unlike leaf spot, leaf blotch is capable of spreading to wheat heads (called glume blotch). It is favored by wet conditions and temperature in the 68-81°F range.

Leaf rust can survive Michigan winters to a limited extent, but most infections are due to spores that originated from southern states. Infections appear as reddish-orange spore masses on the upper surface of leaves. Leaf wetness and temperature within a range of 60-80°F promote the development of the disease.



Powdery Mildew



Leaf rust

photo by Lee Siler



**Septoria leaf spot (left),
Stag. leaf blotch (right)**

photo by Don Hershman

Table 1: Effect of fungicides for management of wheat diseases
(source: North Central Region Committee NCERA-184 revised 4-6-11)

	Active ingredient Product	Rate/A (fl. oz)	Powdery mildew	Stag. leaf blotch	Septoria leaf spot	Stripe rust	Leaf rust	Head scab	Harvest Restriction
Strobilurin	Quadris 2.08 SC azoxystrobin 22.9%	6.2 - 10.8	F(G) ¹	VG	VG	E ²	E	NL	45 days
	Evito 480 SC fluoxastrobin 40.3%	2.0 - 4.0	G	-- ³	-- ³	-- ³	VG	NL	40 days
	Headline SC pyraclostrobin 23.6%	6.0 - 9.0	G	VG	VG	E ²	E	NL	Feekes 10.5
Triazole	Alto 100 SL cyproconazole 23.6%	3.0 - 5.5	-- ³	-- ³	-- ³	-- ³	-- ³	-- ³	30 days
	Caramba 0.75 SL metconazole 8.6%	10.0 - 17.0	VG	VG	-- ³	E	E	G	30 days
	Tilt 3.6 EC & generics ⁴ propiconazole 41.8%	4.0	VG	VG	VG	VG	VG	P	Feekes 10.5
	Proline 480 SC prothioconazole 41%	5.0 - 5.7	-- ³	VG	VG	--	VG	G	30 days
	Folicur 3.6 & generics ⁴ tebuconazole 38.7%	4.0	G	VG	VG	E	E	F	30 days
	Prosaro 421 SC prothioconazole 19% plus tebuconazole 19%	6.5 - 8.2	G	VG	VG	E	E	G	30 days
Triazole + Strobilurin	TwinLine 1.75 EC metconazole 7.4% plus pyraclostrobin 12%	7.0 - 9.0	G	VG	VG	E	E	NL	Feekes 10.5
	Quilt 200 SC propiconazole 11.7% plus azoxystrobin 7.0%	14.0	VG	VG	VG	E	E	NL	Feekes 10.5
	Quilt Xcel 2.2 SE ⁵ propiconazole 11.7% plus azoxystrobin 13.5%	14.0	-- ³	VG	-- ³	-- ³	VG	NL	Feekes 10.5
	Stratego 250 EC propiconazole 11.4% plus trifloxystrobin 11.4%	10.0	G	VG	VG	VG	VG	NL	35 days
	Absolute 500 SC tebuconazole 22.6% trifloxystrobin 22.6%	5.0	G	-- ³	-- ³	-- ³	E	NL	35 days

¹ Efficacy categories: NL=Not Labeled and Not Recommended; P=Poor; F=Fair; G=Good; VG=Very Good; E=Excellent. Efficacy designation with a second rating in parenthesis indicates greater efficacy at higher application rates.

² Efficacy may be significantly reduced if solo strobilurin products are applied after stripe rust infection of has occurred

³ Insufficient data to make statement about efficacy of this product

⁴ Multiple generic products containing propiconazole and tebuconazole may also be labeled in some states. Products containing *tebuconazole* include Embrace, Monsoon, Muscle 3.6 F, Onset, Orius 3.6 F, Tebucon 3.6 F, Tebustar 3.6 F, Tebuzol 3.6 F, Tegrol, and Toledo. Products containing propiconazole include Bumper 41.8 EC, Fitness, Propicanazole E-AG, and PropiMax 3.6 EC.