

Managing Fusarium Head Blight

May, 2010

Fusarium head blight (FHB), commonly called scab, is caused by fungi in the genus *Fusarium*. It is the single most important disease of wheat and one of the most difficult to prevent. The disease can cause spikelets to appear bleached. Severely infected kernels tend to be shriveled, light weight and, sometimes, chalky white or pink in color. FHB is capable of causing some loss in grain yield, but the most significant financial losses stem from a mycotoxin created by the fungus within the infected grain called deoxynivalenol (DON or vomitoxin). More information can be found at <http://www.scabusa.org>.

Weather has the greatest influence on disease development. Rainfall and moderately warm temperatures at the time of flowering are most advantageous to the pathogen. However, the disease is also favored by above normal rainfall several days prior to flowering, as it encourages spore numbers and dissemination. Likewise, wet conditions following flowering can compound the problem as it favors both disease development and the production of DON. A risk model based on local weather can be found at http://www.wheatscab.psu.edu/riskTool_2010.html and a sign-up to receive in-season scab alerts can be accessed at http://scabusa.org/fhb_alert.php.

Varietal resistance offers limited protection from FHB, as the highest yielding varieties currently grown in Michigan are moderately to highly susceptible. However, breeders are beginning to release less susceptible varieties that could help reduce DON levels. Michigan State University's annual variety trial results report a FHB index for all varieties (<http://www.css.msu.edu/varietytrials/wheat/>).

Soft white and soft red wheat, as sub-classes, are generally comparable in their susceptibility to FHB, though white wheat is often more apt to accumulate DON. Soft white wheat is also disadvantaged by being more likely than soft red wheat to incur discounts because of their different end-uses. While market discounts vary, soft white wheat growers may experience discounts beginning at 1 ppm of DON, whereas discounts for soft red grain may not be imposed until 2 or 3 ppm.

Crop rotations matter, as residues from the previously infected crop can harbor the *Fusarium* that causes FHB. Residues that represent the greatest risk are those from corn, followed by wheat and barley. Hay sods can also pose a significant risk based on industry experience in Michigan. Using tillage to incorporate infected residues will reduce disease risk, but will not completely mitigate the threat that these rotations pose.

Fungicide use can reduce the severity of FHB by as much as 50 percent. The same might be said for reductions in DON levels, but the effect is less predictable. Growers and researchers have also found that fungicides targeting FHB may result in improved grain quality and/or yield, even where FHB does not develop. This is attributed to the fungicides' contribution to the control of foliar diseases that can threaten the upper plant canopy. Successful applications of fungicides against FHB depend on the use of:

- 1) recommended fungicides (table 1): To date, the most effective products are Prosaro and Caramba. Folicur (and other brands of tebuconazole) is less effective on FHB but, because of less cost, might be considered where the risk of FHB is relatively low, yet foliar diseases threaten the flag leaf or head.



Symptoms of FHB include wheat heads that become partly or completely discolored (photo-Phil Wharton)

- 2) proper application timing: Applications should be made while the wheat heads are in the early stages of flowering (or when anthers can be seen on 25 to 50 percent of heads). This level of flowering usually occurs, depending on air temperatures, 1 to 4 days after the majority of the heads have fully emerged.
- 3) application methods which should include adjusting the boom height to target the wheat heads; angling the nozzles forward to be 30 degrees from horizontal; use of a non-ionic surfactant (refer to product label); 10 to 20 gallons of water per acre; and a spray droplet size that is between the “fine” and “medium” categories (275 to 350 microns)

In practice, wheat is usually considered to be flowering when one or more anthers are visible. This often corresponds to 1 to 4 days after the head becomes entirely visible.
(photo by Steve Gower)



Efficacy of fungicides for FHB management based on appropriate application timing

(source: North Central Region Committee NCERA-184)

Fungicide(s)			Powdery mildew	leaf/glume blotch	Septoria leaf blotch	Stripe rust	Leaf rust	Stem rust ⁴	Head scab	Harvest Restriction
Active ingredient	Product	Rate/A (fl. oz)								
Metconazole 8.6%	Caramba 0.75 SL	10.0 - 17.0	VG ¹	VG	-- ²	E	E	E	G	30 days
Propiconazole 41.8%	Tilt 3.6 EC PropiMax 3.6 EC Bumper 41.8 EC	4.0	VG	VG	VG	VG	VG	VG	P	Feekes 10.5
Prothioconazole 41%	Proline 480 SC	5.0 - 5.7	-- ²	VG	VG	-- ²	VG	VG	G	30 days
Tebuconazole 38.7%	Folicur 3.6 F ³	4.0	G	VG	VG	E	E	E	F	30 days
Prothioconazole 19% Tebuconazole 19%	Prosaro 421 SC	6.5 - 8.5	G	VG	VG	E	E	E	G	30 days

¹ Efficacy categories: NR=Not Recommended; P=Poor; F=Fair; G=Good; VG=Very Good; E=Excellent.

² Insufficient data to make statement about efficacy of this product

³ Multiple generic products containing tebuconazole may also be labeled in some states. These products include: Muscle 3.6 F, Orius 3.6 F, Tebucon 3.6 F, Tebustar 3.6 F, Tebuzol 3.6 F, Tegrol , & Toledo

⁴ Estimates of fungicide efficacy against stem rust are based on a small number of observations, and may be less reliable than the ratings for other diseases.

Source: Management of Fusarium Head Blight (Scab), Brown-Rytlewski, Nagelkirk, and Kirk, MSU Extension

Reviewed by William W. Kirk and Janet Lewis, MSU

Martin Nagelkirk and William W. Kirk

MSU is an affirmative action/equal opportunity employer. Michigan State University Extension programs and materials are open to all without regard to race, color, national origin, gender, gender identity, religion, age, height, weight, disability, political beliefs, sexual orientation, marital status, family status, or veteran status. Issued in furtherance of MSU Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Thomas G. Coon, Director, MSU Extension, East Lansing, MI 48824. This information is for educational purposes only. Reference to commercial products or trade names does not imply endorsement by MSU Extension or bias against those not mentioned.