

Fusarium head blight (FHB), commonly called head scab, is one of the most significant threats to the successful production of malting barley in Michigan. The disease can reduce yield through sterility of individual florets and by the deterioration of infected kernels. The most significant financial loss, however, stems from the production of a mycotoxin created by the fungus called deoxynivalenol (DON or vomitoxin). In the malting barley market, grain is often rejected or its value severely discounted where DON levels exceed 1 ppm.

Weather has the greatest influence on disease development. Damp conditions and moderately warm temperatures at the time of heading are most advantageous to the pathogen. However, it is also favored to a lesser extent by wet weather several days prior to heading, as it encourages spore production and dissemination. Likewise, wet conditions following heading can compound the problem as it favors both disease development and the production of DON.

Selecting varieties having the least susceptibility to scab is a critical part of reducing the risk of FHB. The level of susceptibility of any given variety should be available from breeders or seed dealers. Currently, Michigan State University is independently assessing the susceptibility of barley varieties and will eventually be able to share data on the characteristics of various malting barley varieties including their susceptibility to FHB.

Crop rotations matter, as residues from the previously infected crop can harbor the Fusarium fungus and, thereby, increase the chance for infection. The greatest risk is where barley follows corn. However, barley following wheat, hay crops or another barley crop can also elevate the risk of FHB. Using tillage to completely incorporate the residue from these crops will reduce the amount of inoculum generated within the field, although the risk of Fusarium spores from outside the immediate field remains.

Fungicide use is encouraged as it may reduce the severity of FHB by 20 to 50 percent and DON levels by 40 to 60 percent, although the actual reductions are highly variable. Using recommended fungicides also tends to boost yields by significantly reducing the severity of various leaf diseases that often attack barley. To improve an application's effectiveness against FHB:



*FHB infected florets
(photo: by A. Friskop)*



Infected kernel may be shrunk and appear bleached or pinkish in color; and eventually may take on a sooty appearance (photo by P. Schwarz, NDSU)

- 1) use Caramba (BASF Ag Products) or Prosaro (Bayer CropScience) fungicides. Caramba 0.75 SL can be used at a rate of 13.5 to 17 fl.oz/ac and Prosaro 421 SC at 6.5 to 10.2 fl.oz/ac. Both products should be used with a nonionic surfactant at 0.125% of spray volume.
- 2) use proper application timing. Fungicide applications should occur when most of the heads are completely exposed. This timing attempts to approximate the time when barley is shedding spent flowers (spring barley flowering occurs in the boot stage). As shown in the picture below, the third head represents the best time to apply a fungicide whereas the heads on either side may be a couple days too early or too late for best effect. This timing attempts to approximate the time when barley is most actively shedding pollen.
- 3) make application adjustments. According to university research in the U.S.:
 - a. the boom height should be adjusted upward to target the barley heads;
 - b. dual nozzles angled 30 degrees down from horizontal both forward and backward are preferred;
 - c. use nozzles and pressure that provide a droplet size between the “fine” and “medium” categories (275 to 350 microns); and
 - d. calibrate sprayer to deliver 10 to 20 gallons per acre with preference given to the higher end of the range.



Applications of Fungicide targeting FHB should be made when most of the heads have fully emerged- similar to the third head from the left. (Photo by J Ransom, NDSU)

Malting Barley production in Michigan

http://aqbiosearch.msu.edu/uploads/396/36753/Research_Files/Malting_Barley_Production_in_Michigan_-_GMI035.pdf;

Ground application of Fungicide AE1314

<https://www.aq.ndsu.edu/publications/crops/ground-application-of-fungicide-for-the-suppression-of-fusarium-head-blight-in-small-grains/ae-1314-ground-application-of-fungicides.pdf>

Fusarium head blight or scab, American Society of Pathology

<http://www.apsnet.org/edcenter/intropp/lessons/fungi/ascomycetes/Pages/Fusarium.aspx>

Fusarium head blight of small grains, NDSU Extension

http://scabusa.org/pdfs/NDSU_PP-804_FHB-Small-Grains.pdf

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