



Fusarium Head Blight and its Control

by Dr. Tarlok Singh Sahota, CCA-ON

Fusarium Head Blight (FHB), one of the most important fungal diseases of cereals (costing Canadian wheat and barley producers millions of dollars annually) is caused by *Gibberella zeae* (syn. *Fusarium graminearum*). It is the same pathogen that causes Gibberella stalk and ear rot in corn. The fungus over winters and multiplies in the infected crop residues of small grains and corn. Rain and wind carry spores of the fungus to the heads of the cereals at flowering (pollination) time in wheat and after flowering in barley and then grow into the kernels, glumes or other parts of the head. Under favourable weather conditions, fungal infection could continue until close to grain maturity. Spores could come from within the same field and from other fields at a long distance. Infected heads are either bleached totally or partly (with both the bleached and the green parts seen in the same head).

FHB infected crops yield less and have lower test weights. Infected grains could contain mycotoxin such as deoxynivalenol or DON (vomitoxin). Presence of DON could lower grain grade and market price or even lead to refusal of grain purchase by the buyers. DON levels in finished grain products for human consumption shouldn't exceed 1 ppm.

Two high risk factors for disease severity are: (i) conservation tillage practices and continuous cropping of cereals, or growing cereals in rotation with corn and (ii) rain - particularly during flowering (anthesis) followed by wet or humid conditions. In fact, these conditions are conducive to infection and spread of all fungal diseases in cereals.

The payback from control of FHB is improvement in malt barley quality, better bushel weights in feed barley and better grades in wheat and ultimately, a better bottom line.

Following steps/practices may be essential for effective disease control:

Vigilance: Be aware of what your neighbours are growing and what diseases might be problems in their crops, because FHB spores are spread by wind and rain.

Scouting: Scout fields, especially at or after flag leaf emergence to check for disease levels. Healthy flag and upper leaves are known to contribute more than 50 % to grain filling.

Crop Rotations: FHB incidence increases ten-fold after corn. Crop rotations that allow a two year break from corn and a one year break from small grains and grasses are recommended to minimize the build-up of FHB inoculum in residues and its infection in cereals.

Tillage Practices: Zero tillage could increase disease intensity. Cultivation could bury 30-90 % of the disease inoculum.

Spraying Practices: Foliar fungicides applied at the proper rate and time can control cereal leaf diseases and help to attain target yields. Apply foliar fungicides

when infection levels are low; the wind is calm; humidity is > 60 % and air temperature is between 100 - 250 C. Optimum time to spray is at 1-2 days of heading. Zero day is when 75 % of the heads are out. This means spraying within the next two days of 75 % heading. The fungicides could be sprayed up to 6-7 days of heading, but will be less effective if sprayed late. Use recommended spray nozzles - alternating forward and backward to target the fungicide on both sides of the head!

Foliar Fungicides:

Folicur: Active ingredient – tebuconazole,.

Prosaro®: Active ingredients – prothioconazole and tebuconazole

Caramba: Active ingredient – metconazole

Proline: Active ingredient – prothioconazole

What does research indicate about these fungicides?

Work done at the University of Illinois, USA, indicated that Folicur was the least effective in lowering DON levels or in controlling FHB as compared to Prosaro and Caramba. On-farm research by OMAFRA in 2007 revealed that Folicur application increased the wheat grain yield by 2.6 bu/ac and lowered the DON level to 0.97 ppm as compared to 1.09 ppm in the unsprayed plots. Proline spray increased the wheat grain yield by 4.5 bu/ac and brought down the DON level to 0.64 ppm. Subsequent studies have recorded a grain yield increase of over 9 bu/ac. It was also found that gain from straw yield increase was \$ 7/ ac with Folicur and \$18/ac with Proline. Research results reported from Manitoba in 2013 (<https://www.tandfonline.com/doi/abs/10.1080/07060661.2013.773942>) indicated that fungicides listed in this note reduced FHB index, per cent *Fusarium*-damaged kernels (% FDK) and DON levels and increased yield compared with the non-sprayed control in a moderately resistant variety (Glenn).

FHB Control - Harvest and Storage:

- Most infected kernels are small and light
 - blow out infected kernels by increasing air blast and reducing ground speed
- Store at 14% moisture or lower to avoid Fusarium fungus growth
 - opportunity to re-clean

Summary & Conclusions:

- Don't grow cereals after cereals or after corn.
- Scout for FHB from flag leaf stage (Zadok's Scale 47).
- Watch for weather (humid or dry?)
- Spray fungicides at optimum rates, methods and times.
- In years conducive to infection and spread of FHB, gain (grain yield and grade, straw strength and yield) from fungicide spray will significantly exceed its cost.

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Dr. Tarlok Singh Sahota is the Director of at the Lakehead University Agricultural Research Station Thunder Bay. For more information call (807) 473-57073 or email at tssahota@lakeheadu.ca.

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This industry driven program helps ensure that Ontario crop producers are well served by those providing their crop production advice. This article was written by one of those CCA's.