

Managing fusarium mycotoxin risk in wheat intended for human food – harvest 2008



Update

This Topic Sheet updates earlier publications on the HGCA risk assessment scheme and shows how farmers can access online information on risk as the season progresses.

Fusarium mycotoxins

Mycotoxins are toxic chemicals produced by specific fungi infecting crops; different fungal species produce mycotoxins of widely varying toxicity to humans and animals. Fusarium mycotoxins are produced while the wheat crop is growing and are extremely unlikely to increase after harvest under UK conditions.

In the field, infection of ears by some *Fusarium* species can result in mycotoxins when weather is warm and wet at flowering. Wet weather also delays harvest and increases mycotoxin risk. Wheat crops infected at flowering may have individual bleached spikelets or partially bleached ears, resulting in pink or chalky-white shrivelled grains at harvest. However, there is little correlation between fusarium-damaged grain and mycotoxin occurrence.

Action

Use the HGCA scheme to assess the risk of fusarium mycotoxins in your grain and consider modifying your agronomy as the season progresses.

Assess fusarium risk pre-flowering and consider use of an appropriate T3 fungicide.

Monitor the HGCA website for high risk counties (if any) in 2008 (or websites of AIC or nabim) during the autumn.

Conduct risk assessment on wheat intended for human consumption, using revised 2008 scheme.

For a combined risk assessment for wheat from different fields, consider using the downloadable risk assessment tool.

If a test is needed, refer to 'Grain sampling from field to buyer - understanding variation', HGCA (2004) for guidance on obtaining a representative sample.

If a test is needed, consult your merchant about the best means of getting this done.

Need for risk assessment

Legal limits exist for fusarium mycotoxins (deoxynivalenol (DON) and zearalenone) in wheat intended for human consumption (Table 1) and there are guidance limits for grain for feed (Table 2). The risk of exceeding these limits in the UK is relatively low but varies with year, region (see map), weather and agronomy.

Table 1. Legal limits for mycotoxins (ppb) in grain intended for human consumption

	DON	Zearalenone
Unprocessed common wheat and barley	1,250	100
Unprocessed durum wheat and oats	1,750	100
Flour	750	75
Finished products	500	50
Infant food	200	20

Table 2. EU guidance values for mycotoxins (ppb) in grain intended for animal feedstuffs

	DON	Zearalenone
Feed grains	8,000	2,000
Complete feedstuffs for		
– pigs	900	250 (100*)
– calves, lambs and kids	2,000	500

*Applies to feed intended for piglets and gilts

Always consider your local conditions and consult a BASIS-qualified adviser if necessary.

In response to the higher level of risk during the 2007 harvest, the industry adopted the HGCA risk assessment scheme to help minimise costs of compliance with legislation. Performing a fusarium risk assessment is required by crop assurance schemes and became mandatory as part of the grain passport for wheat in 2007 and thereafter.

The risk assessment shown here applies ONLY to wheat but the general agronomic principles are likely to reduce fusarium mycotoxin risk in barley.

New for 2008

Based on ongoing research, several improvements were made for 2008 (Table 3) and the downloadable HGCA fusarium risk assessment tool was updated – see ‘Further information’.

For 2007, section 3 of the grain passport specified additional mycotoxin testing requirements in particular counties. For 2008, nabim and AIC member companies will continue to undertake early harvest testing, which may identify high risk counties. If any are found, they are likely to differ from those in 2007 and will be posted on the websites of HGCA (www.hgca.com), nabim (www.nabim.org) and AIC (www.agindustries.org.uk) during the harvest period.

Definitions of risk factors

Cultivation: Crop debris is an important source of fusarium. Complete burial by ploughing reduces risk to the greatest extent while risk is highest with direct drilling. Intensive non-inversion tillage (3 or more cultivations with discs, tines or chisel plough) is more effective at reducing risk than standard non-inversion tillage (1 or 2 cultivations).
Note that several cultivations may be achieved in a single pass using appropriate machinery.

Wheat variety: Enter according to HGCA Recommended List rating for fusarium ear blight. If score is not known, assume susceptible and allocate score of 1.

T3 fungicide: The benefit of using an appropriate rate of a T3 fungicide recommended against fusarium and/or mycotoxin production results in a negative score. Current recommended fungicides include products containing dimoxystrobin, metconazole, prothioconazole, tebuconazole or bromuconazole.

Rainfall at flowering: Wet weather promotes fusarium development. The score is based on total rainfall during flowering (GS59-69 – full ear emergence to end of flowering).

Rainfall pre-harvest: Based on total rainfall from crop starting to ripen (GS87 – hard dough) to harvest.

Risk of DON and zearalenone, based on distribution of mycotoxins, 2001 - 07



Further information

Dr Simon Edwards,
Harper Adams University College
sedwards@harper-adams.ac.uk

Grain sampling from field to buyer - understanding variation, HGCA (2004)

Guidelines to minimise risk of fusarium mycotoxins in cereals, HGCA (2007)

CropMonitor
www.cropmonitor.co.uk

The UK code of good agricultural practice to reduce fusarium mycotoxins in cereals, FSA (2007)
www.food.gov.uk/multimedia/pdfs/fusariumcop.pdf

Downloadable HGCA fusarium risk assessment tool updated for 2008 www.hgca.com/fusariumrisk

Table 3. The HGCA wheat risk assessment for 2008

Factor	Details	Risk	Score
Region (see map)	High		4
	Moderate		2
	Low		1
	Very low		0
Previous crop	Maize		6
	Other		0
Cultivation	Direct-drilled		4
	Standard non-inversion tillage		3
	Intensive non-inversion tillage		2
	Plough (full soil inversion)		0
Wheat variety	RL resistance rating 1 - 5		1
	RL resistance rating 6 - 9		0
Your pre-flowering score			<input type="text"/>
T3 fungicide	Under 50% of recommended product		0
	50 - 74% of recommended product		-2
	75% or above of recommended product		-3
Rainfall at flowering	High (more than 40mm)		5
	Moderate (10 - 40mm)		2
	Low (less than 10mm)		0
Rainfall pre-harvest	Wet (more than 20mm)		3
	Dry (less than 20mm)		0
Your final score			<input type="text"/>
<i>Consider testing if you are aware of high fusarium incidence in your crop.</i>		Risk	Final score
		High	over 15
		Medium	10 - 15
		Low	under 10

HGCA has provided funding for this project but has not conducted the research or written this report. While authors have worked on the best information available to them, neither the HGCA nor the authors shall in any event be liable for any loss, damage or injury howsoever directly or indirectly in relation to the report or the research on which it is based.

Reference herein to trade names and proprietary products without stating that they are protected does not imply they may be regarded as unprotected and thus free for general use. No endorsement of named products is intended, nor is any criticism implied of other alternative, but unnamed products.