Managing Fusarium mycotoxin risk in wheat

Centre for Rural Innovation
at Harper Adams University College

PROJECT SUMMARY

EXPERTS at Harper Adams University College have completed an investigation into the scale of the mycotoxin risk in UK wheat production. Mycotoxins are toxic compounds produced by certain species of fungi. Grain is susceptible to mycotoxins produced either while the crop is growing by species of *Fusarium* or during storage by species of *Penicillium*. Fusarium mycotoxins are produced in the growing crop as a result of Fusarium ear blight. Infection occurs in warm, wet weather during flowering.

From July 2006, new legal EU limits for mycotoxins, deoxynivalenol (DON) and zearalenone (ZEAR), produced by various *Fusarium* species infecting the ear apply to grain intended for human consumption. A small proportion of the UK wheat crop has exceeded these limits in recent seasons. Fusarium mycotoxins are remarkably stable during processing and if present in the raw grain may occur in foods containing wheat flour. During the project, 300 grain samples were collected annually from conventional and organic crops. Concentrations of eleven mycotoxins were determined and related to data on region and crop agronomy. DON was the most frequently occurring mycotoxin and was likely to be of most concern. However, limits for ZEAR are considerably lower so in some years there may be a greater risk of exceeding ZEAR rather than DON limits. Risk varied from year to year but was greatest in the warmest areas (south and east England) and lowest in cooler, more northerly regions (northern England and Scotland).

The project also assessed the incidence of 'pink grains', a common symptom of Fusarium infection but the number of pink grains in samples was poorly related to mycotoxin concentration. Risk of DON or ZEAR in commercial crops around Britain was related to various factors. Location, rotation, method of cultivation, variety choice and fungicide application were all significant risk factors. T3 triazole sprays significantly reduced DON concentration. HGCA funded field trials indicated that using tebuconazole, metconazole or prothioconazole at T3 (early to mid-flowering) at half to full rate significantly reduced DON concentration in harvested grain.

Following the project, growers of milling wheat are advised to follow "Good Agricultural Practice to reduce the risk from fusarium mycotoxins" detailed below:

- Avoid growing milling wheat immediately after maize.
- Avoid minimum tillage after maize, wheat or potatoes.
- Use T3 fungicides recommended to control Fusarium ear blight.
- Choose wheat varieties with high Fusarium resistance.
- Assess risk of mycotoxins in grain and test if necessary before transporting it off-farm.

Results indicate how you can reduce, but not eliminate, this risk by modifying your agronomic practices.

KEY FACTS:

Lead Group: Crops

Key Theme: Food Chain Safety

Contract Value: £320K

Project Leader: Simon Edwards

Project Duration: Five Years

Sponsor/Client: FSA and HGCA

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General enquiries

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