Risk assessment for fusarium mycotoxins in winter wheat: rainfall tool

There are legal limits for fusarium mycotoxins deoxynivalenol (DON) and zearalenone (ZON) in wheat intended for human consumption and guidance limits for feed grain. The owner (farmer, merchant or processor) is legally obliged to ensure grain is safe for human consumption.

Crop assurance schemes require a mycotoxin risk assessment score to be entered onto the combinable crops passport. Calculating risk requires knowledge of the cropping region, previous crop, cultivation approach, varietal disease resistance rating and T3 fungicide dose. The assessment also requires accurate measurements of rainfall during the flowering and pre-harvest periods. This is essential because wet weather during these times promotes fusarium development. As rainfall events are often highly localised, nothing can substitute for field-level rainfall data. However, such data may not be available or reliable. In such circumstances, other local sources of rainfall information will be required.

The AHDB WeatherHub brings together sources of weather data. It includes daily rainfall data (‘raw data’ tab) gathered from thousands of sites across England and Scotland. This information has been used to create a simple map-based tool. The tool can be used to calculate the amount of rainfall that has fallen during defined flowering and pre-harvest periods. It also produces a risk assessment score for rainfall.

*Note: Each Friday, results are quality controlled and anomalous data are removed – the latest ‘clean’ data can be viewed via the ‘QC’ tab.

How to use the rainfall tool

1. Access the tool, and other risk assessment information, at ahdb.org.uk/mycotoxins
2. Enter the start and end dates in the boxes (typed in manually or selected from the pop-up calendar) for the defined rainfall period(s)**
3. At each site, a coloured circle reveals the risk score for the defined rainfall period
4. Float the mouse cursor over a site to show the rainfall (mm) that fell during the defined period
5. Enter the relevant score(s) onto the risk assessment

Figure 1. Left: Rainfall recorded during flowering for sites across South-West England. Selected site shows the total amount of rainfall (mm) received at that location. Right: Mycotoxin risk values and associated risk colour codes.
**Start and end dates**

In winter wheat, the first risk period is during flowering – GS59 (ear completely emerged above flag leaf ligule) to GS69 (flowering complete). As infection occurs via fresh anthers (i.e. not dry, light-coloured and falling off), the duration they are present is critical – this period rarely exceeds 10 days. The second key rainfall risk period is GS87 (hard dough, thumbnail impression held) to harvest.

![Figure 2. Key growth stages during the flowering period (images courtesy of Bayer CropScience).](image)

![Figure 3. Life cycle of Fusarium species](image)