

## EVALUATING BREEDING MATERIAL SCAB FOR SCAB RESISTANCE

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Resistance to head scab, or Resistance to head scab, or *Fusarium* head blight of wheat (FHB), continues to be a top priority for the wheat breeding program at the University of Kentucky. The fungus that causes FHB survives on many different plant residues, and can be found on corn stubble across Kentucky. The widespread, constant presence of the fungus means that the threat of a FHB epidemic depends on environmental conditions and the susceptibility of the wheat. Fortunately, the level of FHB was low across Kentucky in 2008 and average yield was high at 71 bushels/acre.

To evaluate FHB resistance, breeding lines are planted in dedicated scab nurseries in Lexington and Princeton, KY. Scabby corn is spread in these nurseries to encourage a localized epidemic. In Lexington, a mist irrigation system is also used to increase infection and improve symptom development. The nursery in Princeton is not irrigated, but the amount of moisture in 2008 was enough to create an epidemic when combined with the scabby corn and spore sprays. Screening material in the two locations with different levels of disease over multiple years gives a good evaluation of resistance.

There are many challenges when determining the resistance of breeding lines. Even with irrigation, temperature and other environmental factors impact the disease. Each year the scab epidemic develops differently, as shown in Figure 1. The disease progress curves in Figure 1 represent the development of FHB

in resistant variety Pioneer 25R18 in 4 years of evaluation. The rate of disease increases about 3 weeks after flowering in all 4 years, but the final level of disease differs.

The most important indicators of resistance are post-harvest measurements of percent scabby seed (PSS) and levels of vomitoxin or deoxynivalenol (DON) because they most impact quality of the wheat. For the most part, a variety with low scabby seed has low DON levels, but that's not always the case. Table 1 shows the annual averages for PSS and DON in the Lexington scab nursery. In 2008, the average PSS for all the Lexington material was only 16.5%, the second lowest after 2003, but average DON was 20.4 ppm, third highest of 7 years. This illustrates another complication of FHB, that healthy grain can sometimes have high DON. This fact makes screening with PSS and DON necessary, even though these are time consuming and costly measurements.

Weather conditions during the period from flowering to soft dough have kept FHB from becoming a serious threat to Kentucky wheat over the past 4 years, but weather is unpredictable. The goal of the UK wheat breeding program is to release high-yielding FHB-resistant varieties so that when the weather turns favorable for the fungus, the wheat can withstand the pressure. Evaluation of scab resistance is ongoing, but the process has become more efficient since it began in 2001 and the benefit is that more material can be screened and better varieties released.

# Disease Progress Curve 2005-2008 Lexington, KY Pioneer 25R18

