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Selecting Scab Resistant Wheat Varieties

Dave Van Sanford—Wheat Breeder

Bill Bruening—Variety Testing Specialist

In previous newsletters we have “Selection of wheat varieties is one of the most critical management decisions Kentucky wheat producers will make.” The decision is complicated this fall by the fact that 2009 was a year in which Fusarium head blight (FHB) or head scab, was a problem for KY wheat growers. The real question is “how important is head scab resistance?” Clearly, in a bad head scab year, growers recognize that FHB resistance is very important. After a year or two with little or no head scab, however, farmers tend to underestimate the value of scab resistance. In any given year, how likely is it that head scab will be a serious disease in Kentucky? We know that with our corn-wheat-soybean rotation we will always have plenty of inoculum. Although we don’t know if the moisture requirements of the disease will be met when the crop is flowering, it is reasonable to assume that we will always have a chance of seeing FHB in our Kentucky wheat crop. How serious is the disease? In addition to reducing yield and test weight, the thing that sets FHB apart is the toxin (DON or vomitoxin) that is produced by the fungus. Elevated DON levels can result in serious discounts or even rejection of loads at the elevator or mill. For this reason alone, we need to take head scab very seriously.

Resistant Varieties

The best known and most widely studied genetic resistance comes from Sumai 3, a Chinese spring wheat variety. Pioneer Brand 25R18 is an example of an older soft red winter wheat variety that has Sumai 3 resistance. This is Type II resistance, or resistance to spread of the fungus in the head which means that under heavy FHB pressure, there might be many heads that are infected, but the severity of infection on each head will be low. In addition to the Sumai 3 resistance source, there are numerous adapted SRW varieties with varying levels of scab resistance. Truman and Bess are two varieties released by the University of Missouri which have good scab resistance that is not derived from Sumari 3. Due to

the heavy scab pressure throughout Kentucky in 2009, we had a good opportunity to rate scab symptoms on all 88 entries in the state variety trial (Table 1). Keep in mind that these ratings are based on chaff symptoms observed between flowering and physiological maturity. These symptoms often provide a good indication of kernel damage that is likely to occur, but the relationship is not perfect.

Combining Resistance With Fungicides

When we define FHB resistance, our targets include a low level of infection, plump kernels with no yield or test weight reduction and low DON levels in the grain. In a year like 2009 under heavy scab pressure, it takes a combination of good genetic resistance and a well-timed fungicide application to hit these targets. In Table 2 we present two years of data from our inoculated scab nursery at Princeton where varieties and breeding lines were evaluated with and without a fungicide application.

Scab is a difficult disease for farmers, millers and researchers. It takes several years of testing and retesting to really get to know the scab profile of a variety. For this reason, the data in Tables 1 and 2 should be studied very carefully before deciding which wheat varieties to plant this fall. It is also important to apply the other risk management strategies that we have discussed in previous variety selection articles. In particular it is important to remember that wheat growers can minimize their risks by planting several varieties with good yield and test weight potential that complement one another for disease resistance and maturity. Choosing varieties of differing maturities makes sense for a number of reasons, but it is especially important when considering head scab. In those years when head scab is problematic, if the early flowering varieties are hit hard, then the later flowering types often face less scab pressure, and vice versa. A final suggestion is to avoid planting varieties that appear to be very susceptible to head scab. If a variety completely lacks genetic resistance, a fungicide application will not be sufficient to prevent yield loss and elevated toxin levels during an epidemic scab year.

Table 1. Scab Ratings (1=excellent; 9=poor) Based on Chaff Symptoms; Each Value Represents the Average of Ratings at 6 Variety Trial Locations in Kentucky, 2009

| <u>Variety</u> | <u>Head Scab</u> |
|---------------------|------------------|
| AgriPro Branson | 6.6 |
| AgriPro COKER 9511 | 3.9 |
| AgriPro COKER Oakes | 5.5 |
| AgriPro W1104 | 4.5 |
| AgriPro W1377 | 5.4 |
| AgriPro W1566 | 6.1 |
| ARMOR 360Z | 6.4 |
| ARMOR ARX 6202 | 6.3 |
| ARMOR ARX 840 | 6.8 |
| ARMOR GOLD | 7.0 |
| ARMOR RENEGADE | 5.0 |
| Beck 113 | 5.3 |
| Beck 122 | 5.7 |
| Bess | 4.0 |
| Clark | 5.7 |
| Cumberland | 6.0 |
| Delta Grow 1600 | 5.8 |
| Delta Grow 4500 | 6.2 |
| Delta Grow 5200 | 5.8 |
| Delta King 9108 | 5.9 |
| Delta King 9577 | 7.1 |
| Dixie 907 | 5.9 |
| Dixie 940 | 5.9 |
| Dixie 989 | 6.4 |
| Dyna-Gro 9911 | 5.3 |
| Dyna-Gro 9922 | 5.3 |
| Dyna-Gro Shirley | 6.0 |
| Dyna-Gro V9710 | 6.5 |
| Dyna-Gro V9723 | 5.6 |
| | |

| <u>Variety</u> | <u>Head Scab</u> |
|-----------------------|------------------|
| Dyna-Gro V9812 | 6.6 |
| EXCEL 163 | 6.9 |
| EXCEL 234 | 4.2 |
| EXCEL 341 | 5.6 |
| Exsegen Anna | 6.4 |
| Exsegen Candace | 6.2 |
| Exsegen Dinah | 4.8 |
| Exsegen Lois | 5.6 |
| Exsegen Lydia | 6.5 |
| Jamestown | 6.3 |
| KAS 5003 | 6.0 |
| KAS 5058 | 4.9 |
| KAS 7700 | 5.9 |
| KY 00C-2059-24 | 5.7 |
| KY 00C-2109-01 | 7.3 |
| KY 00C-2175-10 | 6.0 |
| KY 00C-2567-01 | 6.5 |
| KY 00C-2697-04 | 5.9 |
| KY 97C-0321-02-01 | 6.9 |
| KY 97C-0508-01-01A-1 | 5.6 |
| KY 97C-0519-04-07 | 6.1 |
| KY 97C-0540-01-03 | 5.7 |
| KY 97C-0574-01-04 | 5.4 |
| Merl | 7.1 |
| Milton | 5.7 |
| Pembroke | 5.1 |
| Pioneer variety 25R63 | 5.0 |
| Pioneer variety 25R78 | 7.1 |
| Pioneer variety 26R15 | 5.5 |
| Pioneer variety 26R22 | 6.4 |

| <u>Variety</u> | <u>Head Scab</u> |
|-----------------------|------------------|
| Pioneer variety XW07B | 7.1 |
| Pioneer variety XW07X | 3.5 |
| PROGENY 117 | 5.5 |
| PROGENY 119 | 5.5 |
| PROGENY 130 | 5.3 |
| PROGENY 136 | 6.8 |
| PROGENY 166 | 6.3 |
| PROGENY 185 | 5.9 |
| Red Ruby | 6.2 |
| SC 1298 | 5.8 |
| SC 1318 | 6.7 |
| SC 1325 | 5.6 |
| SC 1328B | 5.4 |
| SC 1339 | 7.0 |
| SC 1348 | 6.0 |
| SS 520 | 8.0 |
| SS 5205 | 6.4 |
| SS 548 | 7.0 |
| SS 8302 | 4.9 |
| SS 8309 | 4.4 |
| SS 8404 | 5.9 |
| SS 8641 | 7.6 |
| SS MPV-57 | 6.0 |
| Steyer Geary | 6.5 |
| Steyer Jordan | 5.4 |
| Steyer Nofziger | 6.2 |
| Truman | 2.6 |
| USG 3350 | 6.0 |
| VA 04W-90 | 5.7 |
| Average | 5.9 |

