

Scab Initiative's Support Key to HRS Wheat Variety Development

By Don Lilleboe*

Wouldn't it be wonderful to wave a wand at a serious crop production problem and see it magically disappear? That's not the way things happen, of course — be it in agriculture or any other sector of life. So, the next best approach is to gain a better understanding of the issue, develop improved tools to deal with it — and then mount a hard-hitting campaign focused on overcoming whatever challenges the problem presents.

That's exactly what has been transpiring among Upper Midwest plant breeders as they combat Fusarium Head Blight (FHB) or scab, a disease that has caused billions of dollars in damages to U.S. wheat and barley crops since the early 1990s. Serious scab infections result in lower yields and test weights and also often trigger formation of a primary mycotoxin known as DON (short for deoxynivalenol).

Fortunately, wheat breeders in Minnesota, North Dakota and South Dakota have made substantial strides in developing varieties with moderate resistance to scab. Hard red spring wheat producers in each state now have a number of varietal options that provide either moderate or intermediate resistance to this disease — while simultaneously possessing very competitive levels of key agronomic traits such as grain yield, test weight and straw strength, along with essential quality traits like protein content and functionality. While the war with scab has not yet been won, substantial headway has been made.

Much of the progress has come because of financial and networking support from the U.S. Wheat & Barley Scab Initiative (USWBSI), affirm plant breeders. The USWBSI is a USDA-funded national multi-disciplinary, multi-institutional research system established to minimize the threat from Fusarium Head Blight. University and USDA scientists from some two dozen states currently receive research funding from USWBSI upon approval of their projects via a rigorous review process.

“A coordinated national approach is more effective than piecemeal state-by-state or region-by-region efforts for continued progress” against scab, says University of Minnesota spring wheat breeder James Anderson. “USWBSI funding keeps some of the best minds in small grains cereals in the U.S. engaged in FHB research.”

Anderson points out that agronomic and disease control practices — and newly identified resistance genes — that are identified by one group can, in turn, often be used across different regions and market classes of wheat. “Without a concerted national effort and available funding, I fear that researchers in some regions would discontinue their FHB research,” he states. In Minnesota specifically the USWBSI presently accounts for more than one-third of the wheat breeding program’s funding, Anderson relates.

Karl Glover, spring wheat breeder with South Dakota State University, also places a high value on USWBSI support. “If we hope to continue creating highly moderate-resistant materials (germplasm and cultivars), then USWBSI funding is essential,” Glover states. “In plant breeding, we cannot achieve something without selection for that ‘something.’ Improvements in FHB resistance would be highly unlikely — and the possibility exists that what has been achieved to date could also be lost.”

North Dakota State University spring wheat breeder Mohamed Mergoum underscores the importance of the U.S. Wheat & Barley Scab Initiative to his program as well. “We have developed at least nine hard red spring wheat cultivars with excellent agronomic and quality performance and good disease resistance packages — including good levels of FHB resistance,” Mergoum reports. “These cultivars have been dominating the U.S. spring wheat region, generating hundreds of millions of dollars for wheat growers. Likewise, the wheat industry and the export market have benefited tremendously from these high-quality and FHB-resistant cultivars.”

The NDSU spring wheat breeder describes the support his program receives from the USWBSI as “very important, as it is our main source of funding for FHB research.” Were there to be “a model for a successful USDA-funded project to solve a major threat such as FHB and save a major crop in the U.S. and worldwide,” Mergoum adds, “the USWBSI should be one — at least for spring wheat.”

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