



Science  
Societies

# Hard red winter wheat in the Mid-Atlantic

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*Photo by Danielle MacCallum.*

Hard red winter wheat may be ready for its big break in the Mid-Atlantic region of the United States. After more than two decades of research and development behind the scenes, new varieties and market interest make it poised to become a viable niche crop. While it may not be grown in the same quantities as soft wheat in this region, hard wheat can provide diversity and be a market advantage for growers.

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Hard red winter wheat may be ready for its big break in the Mid-Atlantic region of the United States. After more than two decades of research and development behind the scenes, researchers at Virginia Tech say new varieties and market interest make it poised to become a viable niche crop.

Wade Thomason, professor and grain crops extension specialist at Virginia Tech, says that, overall, hard red winter wheat is more valuable than the soft red winter wheat more common to the region. However, getting the yield and quality, and resulting profits, competitive is challenging and has taken the work of many.

“I want to get folks talking about this crop now because I believe we are right at the edge of where the industry is poised to grow,” he says. “We’ve bred varieties that are competitive with soft wheat yields and prices in our region. We’ve got a couple interested millers. Growers are hearing about this interest and perking up, too. It’s a good time for professional agronomists and others who work with growers to be ready to help growers manage this crop.”

Interest in growing hard red winter wheat started in the 1990s, and so the Virginia Tech wheat-breeding program initiated a breeding effort in the latter part of that decade. Management research was added in the early 2000s, and Virginia Tech released its first line in 2008.

To date, the group at Virginia Tech has released 11 hard red winter wheat lines, including two releases to private companies. Early progress also occurred in areas



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other than research with farmers coming together to partner with the university and milling companies to promote, distribute, and produce hard red winter wheat.

Thomason adds that the wheat remains a niche crop in Virginia with a few thousand acres of production but is poised to grow based on improved market opportunities.

“We realized some time back that it’s easy to see that, in the long term, hard red winter wheat is more valuable than soft because of its end uses,” Thomason says. “So we started to put in efforts here to plan how to grow enough of this crop to at least offset some of the grain that millers would have otherwise been importing from areas in the Great Plains.”

The value of hard red winter wheat comes from its higher protein content (averaging about 12%) than soft red winter wheat (usually less than 10%) as well as its hardness. Higher protein makes hard wheat better suited for foods like breads because more protein equals better gluten formation. The hardness of the kernels allows them to break into finer pieces when ground, resulting in a better rise in bread compared with larger pieces of soft wheat, which are usually destined for cookies, cakes, and crackers. Similar to soft red winter wheat, hard red winter wheat has the characteristic red or bronze hue and is planted in the fall and harvested in the spring or summer.

### **How Do Yield and Quality Stack Up?**

Regions like Nebraska, Kansas, Oklahoma, Arkansas, and portions of Texas are the biggest growers of hard red winter wheat. How does hard red winter wheat from the Mid-Atlantic compare with that grown elsewhere? Thomason says two big topics are of interest to farmers: yield and quality.

When it comes to yield, varieties have been successfully developed for the Mid-Atlantic that have yields that are competitive with soft winter wheat in most instances,

Thomason says. This gives farmers some diversity of choice.

In 2021 testing by Thomason's team at four locations in Virginia, the average yield of the experimental and checks tested was 77 bu/ac. Five new experimental lines and the cultivar HR 5210 yielded more than 83 bu/ac, which was the same as two of the team's soft red winter wheat checks. Quality, though, can prove to be more difficult.



*Winter wheat seeds ready for planting. Photo by Rafael Maeoka.*

“What we produce here is probably going to never outperform that coming from somewhere like Kansas or Nebraska because it's a different climate and profile,” he says.

“Areas like ours with higher precipitation tend to have greater starch content and greater yield, but there is a negative relationship between starch and protein. So it's a function

of our environment.”

Thomason explains that the strategy becomes giving millers the opportunity to buy hard red winter wheat that, although perhaps is not the absolute highest quality, does not have to be shipped long distances—and once blended with other wheat creates a high quality end product. This gives an economic advantage to both the grower and the miller. Thomason says select millers in the region are paying up to \$1/bu over soft red winter wheat for hard red winter wheat with great quality and protein.

“We wouldn't be doing this if the millers weren't interested in purchasing hard wheat,” Thomason says. “You give me demand and a profitable enterprise, and I can find people who want to participate in that. They are really the drivers here, and so we are in many respects also providing support to them along with the growers. It all has to

line up.”

Another key crop issue brought on by the Mid-Atlantic climate is disease and the importance of breeding disease-resistant crops. The varieties available to farmers were bred for good disease resistance, such as against leaf rust, powdery mildew, and Fusarium head blight.

### **Positioning This Specialty Crop in Front of Farmers**

There are many avenues CCAs can take when talking to farmers about starting to grow hard red winter wheat, Thomason says. The first is that it is a specialty crop and will rarely replace all of the soft wheat or other crops they are growing.

John Draper, a CCA and agronomic program manager at the University of Maryland who works mostly with soft wheat, adds that getting a farmer to explore a new crop requires laying out the production costs and presenting ideas of how much it could bring in—especially given all the variables at play between planting and selling. Most importantly for profits, Draper adds, is the need to ensure farmers choose the variety right for their area, are sure it appears on the miller’s desired variety sheets, and have specialty contracts to sell the harvest before growing it. This requires study of the current varieties and market.



*There are many avenues CCAs can take when talking to farmers about starting to grow hard red winter wheat. The first is that it is a specialty crop and will rarely replace all of the soft wheat or other crops they are growing. Photo by Brian Stark.*

“We’ve put significant effort and time into breeding lines specifically for this region,” Thomason says. “And we have conducted management research to optimize inputs and their timing. We invite Certified Crop Advisers to use our findings to make recommendations to farmers.”

In addition, the advisers should talk to farmers about their equipment to make sure they can manage and harvest the crop, which will need to be done separately to keep it from being combined with soft winter wheat. While most farmers who begin to grow hard red winter wheat are already wheat growers, Thomason says, it’s important to be attentive to nitrogen management to achieve ideal protein content, as well as to the control of disease and pests. The region’s history of intensive wheat management means CCAs and growers are familiar with these needs.

“The husbandry becomes an essential component when growing a new crop,” Draper says. “The pesticide and fertility recommendations can change pretty dramatically from one crop to another.”



*Some farmers in Virginia are double-cropping wheat and soybeans. After wheat is harvested, soybeans are planted immediately in that field with the goal to harvest two crops in one calendar year.*

*Photo by Dwaine McGriff.*

The most common current setup is that a farmer who grows mostly soft wheat adds a few acres of hard wheat although there is a handful growing solely hard red winter wheat. Overall, farmers in Virginia follow two growing regimes that this niche crop would fit into.

The first is double-cropping wheat and soybeans. After wheat is harvested, soybeans are planted immediately in that field with the goal to harvest two crops in one calendar year. Growers using this system want a wheat

that matures early, so they can plant soybeans as early as possible, as well as a wheat that is short in stature, so there is not a large amount of straw left in the field to deal with. On the other hand, some growers do not double-crop soybeans and may be selling straw. They wouldn't be as worried about time to maturity for the wheat and even want a taller stature to the straw. Thomason says the varieties they have bred offer the phenotypes necessary for these setups.

### **Learning from Past Mistakes**

The budding success story of hard red winter wheat hasn't come without setbacks. Thomason's advice to be diligent with farmers beginning to grow hard red winter wheat isn't just good customer service; he knows that success on the farm is essential to better adoption of the crop. His group has learned from past mistakes.

He recounts a time two decades ago when a hard wheat line from France was marketed heavily but turned out to not be well adapted to the region. The result was several growers having only a small amount of their harvests meet the millers' quality standards.

"Growers can get a bad taste in their mouth from one negative experience, and things can go south quickly if the agronomic piece fails," he says. "That's why CCAs in this region should help make sure we keep the agronomic advantage for this crop by keeping up to speed with the needs here. It's taken years to get past previous mistakes because we hadn't armed farmers with enough information."

### **Buyer Interest Increasing**

Excitement for the crop is building among large companies and smaller, local groups and bakeries, Thomason adds. Virginia's proximity to a large population center ensures a constant high demand for agricultural products. Large millers and gourmet bakeries

all play a market role.

Big millers can produce bread-like products, such as buns for sub sandwiches, on a massive scale, while a small bakery or grain collective can sell and experiment with heirloom varieties and find unique uses. For example, a pleasant surprise came when a group learned one of the Virginia Tech varieties makes an extremely delicious French banquette.

In Thomason's view, the path to farmers deciding to grow hard red winter wheat is overall traditional. His group would partner with an interested miller and buyer, and they would hold a growers' meeting, inviting local farmers in the neighborhood. They would walk through the science and research, management practices, what a buyer is willing to pay, and how to go about seeking more information and a contract.



*Virginia's proximity to a large population center ensures a constant high demand for agricultural products. Large millers and gourmet bakeries all play a market role. Photo courtesy of Adobe Stock/JackF.*

With buyer interest increasing, Thomason is focused on helping growers and businesses be efficient, low cost, and effective. While it may not be grown in the same quantities in Virginia as soft wheat, hard wheat can provide diversity and be a market advantage for growers.

"It's important for our farmers to diversify market opportunities, and it also supports value-added production for the industry," he says. "Effectiveness means producing a specialized product for a specific market that can sustain higher-than commodity prices. We continue to release new cultivars with superior performance, and so the future continues to look bright for this crop in the region."

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