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SEASONS OF FARMING

SUMMER/FALL

Nine, maybe 10 months ago, Eastern Washington farmers planted their winter wheat crop. Now they'll find out if they'll be able to recoup their investment.

Winter wheat, which was planted the previous fall, ripens first, followed by spring wheat. Combines started hitting the fields in Benton and Franklin counties in July, moving north and east through August and September. Most wheat will be harvested by mid-September, although growers in higher elevations may still be harvesting spring wheat as late as October.

During harvest, combines cut the wheat heads off, leaving the stalks. As that residue or stubble decomposes, it will help replenish soil nutrients, protect the ground from wind and water erosion, and shelter next year's crop. Some growers will bale the residue and use it as animal bedding or in animal feed. In no-till and direct seeding operations, next year's winter wheat crop will be planted directly into the previous crop's residue.

From the field, wheat is trucked either to on-farm storage bins or directly to a local county elevator. Because of limited storage capacity, many county elevators often funnel grain to larger, more centralized elevators using trucks and train cars.

Depending on how big the harvest is, grain may be temporarily stored outside in huge grain piles. The final leg of grain's journey happens when it is sold, which can be months after harvest. Most of Eastern Washington's wheat is destined for overseas markets, such as Japan, the Philippines, and South Korea. The grain is loaded onto barges from elevators along the Columbia or Snake rivers, or onto railroad cars, and sent to export terminals in Vancouver and Portland where it is loaded onto ocean-going vessels.

At each step along the journey, the grain is tested and inspected for quality, test weight, and protein. If any of those are found to be lacking, the farmer is docked and will receive a reduced price for their grain.

While farmers have little control over some things that could negatively impact grain quality, like drought, inputs applied months before harvest are key to growing a high quality, high yielding crop. In the spring, farmers apply a nitrogen fertilizer to help maximize their yield, but because nitrogen can also increase protein, they have to carefully balance how much nitrogen is applied. High protein is desirable in some classes of wheat, but not others. Additionally, fertilizer is very expensive, so farmers want to apply only what is needed when it is most beneficial. Growers will also apply pesticides to the growing crop to deal with weeds, disease, and pests, all of which can impact grain quality and yield. Like fertilizer, pesticides are extremely expensive, so they are applied sparingly and only when needed.

Even if a farmer's harvest is outstanding, they aren't out of the woods yet. They must sell their crop at a high enough price to pay back the money they've already spent on seed, inputs, fuel, and equipment, plus have enough left over to purchase seed and inputs for the next year's crop. The price of wheat is dictated by the global market; wheat farmers have very little negotiating power and as costs rise, can't pass those increases to the consumer.

By early fall, most Eastern Washington growers will have finished harvest and moved on to planting their winter wheat crop. Depending on the weather, they may "dust" the wheat in, which means planting in very dry conditions and hoping the rain will come, or they might wait to plant until some rain falls. ■



HARVEST TERMS

THE LANGUAGE OF FARMING: The agriculture industry has its own specialized and technical language, often learned by farmers from a young age. But to many others, including some landlords and extended family, this language is not as familiar. This infographic explains some common terms used during the harvest season in Washington.

COMBINE: A machine that combines the tasks of harvesting, threshing, and cleaning grain crops.



1 HEADER: A component of a combine that gathers the crop and feeds it into the threshing mechanism.

2 DRAPER: A type of header on a combine that uses a fabric or rubber belt to convey the cut crop to the threshing mechanism.

3 BULK TANK: A storage space on a combine harvester where the grain is temporarily held before being transferred to a truck or grain cart.

4 CHAFF: The husks and other dry, scaly plant material separated from the kernels (seeds) during threshing.

5 RESIDUE (aka stubble): The remains of the crop left in the field after harvesting, such as stalks and chaff, which can be used for soil conservation or as animal bedding.

6 AUGER: A screw conveyor used to move grain from one location to another, such as from the combine to the grain cart, or from a grain cart to a storage bin.

7 HOPPER: A large storage container designed for the efficient handling, storage, and discharge of grains or other bulk materials. Also a component of grain rail cars (aka hopper cars), elevators, and other storage facilities.

8 WATER TRUCK: A vehicle equipped with a large tank used to transport water to the field, for dust control or firefighting purposes during harvest.

9 ELEVATOR: A facility where grain is stored and handled, including equipment for weighing and loading onto transport vehicles. Larger facilities also include equipment for cleaning, blending, and quality screening.

10 SAFETY/FIRE CONTROL: Safety practices during harvest include parking vehicles on bare soil (without dry crop residue) to reduce the risk of fire. You might hear a farmer say: *"Park on the black ground."*

SCALE: A device used to accurately measure the weight of the grain, often found at grain elevators or within the harvesting equipment.

SAMPLING: The process of collecting a representative sample from each load of grain at the elevator to assess quality, moisture, and protein content.

IMPACT MILL: A device that crushes weed seeds collected during harvest, reducing the spread of weeds in subsequent crops.

BLENDING: The process of mixing grains from different sources to achieve a desired quality or to meet specific grading requirements.

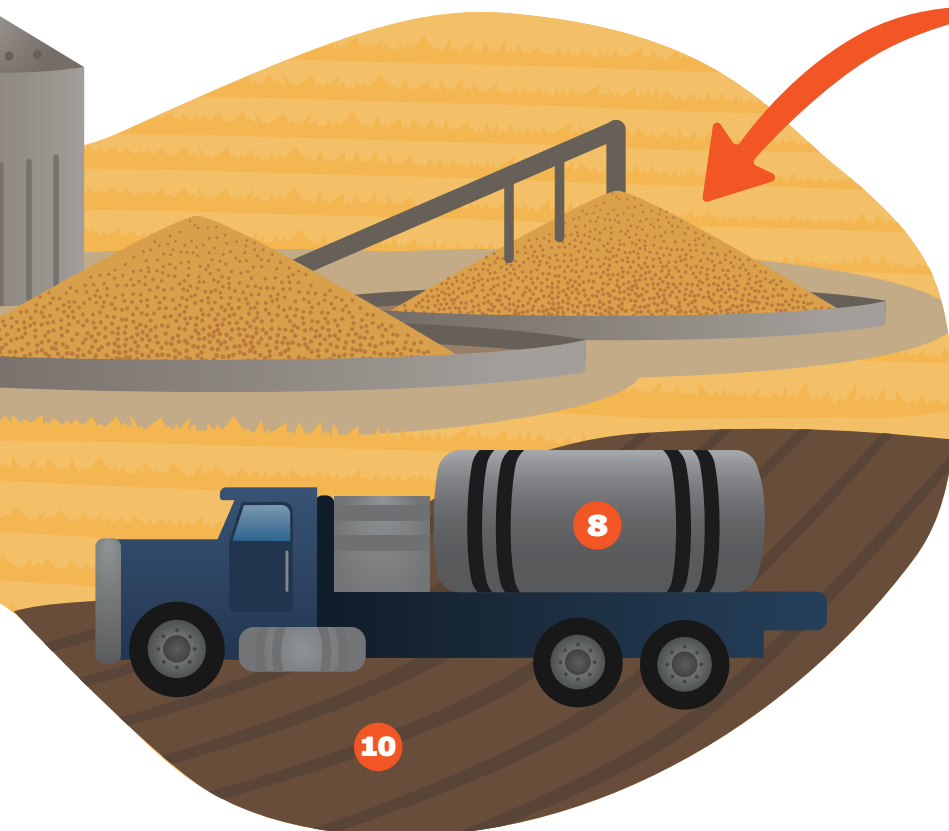


BUSHEL: A unit of volume measurement used for grains, equivalent to just over 9 gallons and weighs approximately 60 pounds (depending on kernel size) for wheat and approximately 48 pounds for barley.

TEST WEIGHT & PROTEIN: A measure of the grain's weight per bushel and its protein content, which are critical factors in determining grain quality.



BANK-OUT WAGON
(aka grain cart): A mobile storage unit used to transport grain from the combine to the truck or storage area.



WHY IS A GRAIN PILE SITTING THERE?

When wheat harvest starts in Eastern Washington, elevators are quickly inundated with more grain than they have storage for. The solution is to pile the grain outside in huge piles.

"It's temporary storage to handle the crop," explained Mark Weber, general manager of Tri-Cities Grain in Pasco, Wash. Tri-Cities Grain uses four grain piles that sit on pavement, not dirt. "Harvest for us starts the first part of July to the last part of August. As soon as those piles are finished up and full or harvest is complete, we put the tarp on."

The bustle of unloading the grain will usually keep birds and other animals away, and because summer in Eastern Washington is generally dry, the quality of the grain being stored outside is unaffected. The grain is treated for potential bugs, and the piles are covered with a tarp as quickly as possible. Multiple tarps are sewn together and then rolled down over the grain. Pipes crossing the base of the pile will use fans to act like a giant vacuum, sucking air out of the grain to cool it and keeping the tarp in place.

Grain stored in piles is usually picked up that fall or winter and either shipped to customers or moved into upright storage.

Nitrogen Stewardship

How yield consistency, crop rotations, weather, and new technologies influence fertilizer use

By Jennifer Ferrero

Nitrogen is all around us. It is a colorless and odorless gas converted into a fertilizer for food production. Are nitrogen fertilizers helpful or harmful? How and when can it be applied to make the most impact in an ever-changing farming landscape? I turned to the insights of two seasoned farmers, Jack DeWitt and Jim Kent, who have cultivated the land in Eastern Washington and Northeast Oregon for decades. Their experiences, combined with the expertise of a Washington State University (WSU) scientist, shed light on the cooperation of the weather, crop rotations, and benefits of nitrogen fertilizer in this region.



Jack DeWitt, a seasoned farmer with over 70 years of experience in the region, brings a wealth of knowledge to the table. His extensive career, which includes 40 years managing a 5,000-acre farm, ownership of Touchet Valley Seed, and involvement in leading farm organizations, has equipped him with a deep understanding of the industry. In semi-retirement, he manages 40 acres of wine grapes, eight acres of Christmas trees, and 140 acres of wheat, which testify to his expertise.

DeWitt's practical approach to farming, honed by his years of experience, is a testament to the adaptability and resilience of the agricultural industry. He shared that add-

ing nitrogen to what "nature will supply" is necessary for increased yields. However, the amount to add is contingent on moisture (rainfall).

"WSU research claims it takes 2.7 pounds of nitrogen to produce a bushel of soft white wheat. That's 270 pounds of nitrogen for a 100 bushel-per-acre crop," he said. "My soil is about 2.5% organic matter, and I assume nature will supply enough nitrogen from organic matter decomposition for 35 bushels per acre, or about 100 pounds. Soil testing prior to seeding usually shows about 50 pounds of residual nitrogen, so I apply 120 pounds at seeding time to bring the total nitrogen available to 270 pounds. If rainfall during the winter is excessive, I soil test in January or February to see if nitrogen has moved below the root zone of the young wheat. If so, I will add 30 to 50 pounds of additional nitrogen per acre by air."

Rich Koenig, a key figure in the WSU College of Agricultural, Human, and Natural Resource Sciences, has been in various roles with the university and industry for 30 years. His extensive experience and academic background make him a trusted source of information for his customers, including farmers, crop consultants, fertilizer distributors, and the ag industry.

"Farmers use nitrogen fertilizers or fertilizers with nitrogen and phosphorus; nitrogen is the largest single nutrient they use," he said.

The problem farmers are working to solve is nutrient deficiency. Koenig noted that farmers test the soil in the spring and must adjust if the field doesn't look right. He shared that nitrogen prices have tripled over 20 years, so the input cost is high. Nitrogen is manufactured using natural gas to remove it from the atmosphere and turn it into fertilizer.

"Fertilizers are produced where there is a lot of natural gas like Russia, China, Canada, and the U.S.," he explained, adding that it is a domestic commodity marketed to a global community.

"Nitrogen management is crucial from a source, and timing of application, standpoint. The farmers and professionals we work with are highly motivated to be meticulous with their nitrogen use. Nitrogen efficiency is a key goal, aiming to grow as much wheat as possible with as little nitrogen as possible. Since nitrogen is an expensive input, the focus is on maximizing the yield and return. This underscores the urgency and significance of effective nitrogen management in modern agriculture," Koenig emphasized.

The big concerns about nitrogen overuse include groundwater contamination and making the soil acidic and less fertile. Therefore, soil testing is common and helps farmers understand how much to use. Koenig said that consistency is key for wheat farmers, who output their products into baked goods, such as cookies, cakes, and uniform loaves of bread. He said applying the correct amount of nitrogen will help the bread to rise and have high protein.



"If a farmer is growing red wheat and needs to meet the market requirements, they must carefully manage nitrogen for a high protein level. Soft white wheat has a low protein requirement for nonraising products. However, farmers need to manage nitrogen carefully for soft white wheat. It depends upon what bakers need; farmers are motivated by the input cost and the wheat market class they are growing. They can be penalized if the protein is off — too high or too low," he said.

Jim Kent is a wheat farmer in Walla Walla and has been at it for 35 years. He doesn't alternate crops and does use soil testing to make decisions about fertilizers annually. He cites the importance of using nitrogen fertilizer for crop growth and higher yields. One problem with regional farming can include fertilizer runoff and waste, but Kent said, "Many farmers have gone to a chem-fallow rotation with no-till or minimum-till usage. I think this practice has helped tremendously in runoff issues."

Kent believes farmers are good stewards of the land.

"Without fertilizer and Mother Nature cooperating, crops would probably not be as bountiful in certain regions. It has always been challenging to balance adding fertilizer. Soil tests are a must," he said.

He added that new technologies have created precision farming, making applying the right amount of fertilizers at the right time and place easier.

"Not all farmers are capable of partaking in this (precision farming) due to the financial

risks in switching over, but it is an option," He said regarding the technology. "Precision placement of any element can advance the early growth of the seed and give it a better chance of producing more. I believe more farmers will adopt this technology in the future."

Koenig noted the variable use of technology for nitrogen fertilizer placement, such as artificial intelligence (AI), satellite imagery, GPS, and drones. He said these tools allow farmers to identify locations in the field with a problem, allowing them to treat field sections as needed, which can cost less and provide better results.

Reviewing the mass media coverage, DeWitt suggested that there might be a biased portrayal of fertilizers. He supported Kent's claim that farmers are inherently responsible land stewards, and he questioned whether the shift towards organic farming would address concerns about chemical usage. DeWitt also emphasized that conventional farms are becoming more productive, highlighting the importance of synthetic nitrogen for feeding the world's population. He noted that without synthetic nitrogen, the world's farms could only feed half of its 8 billion people. ■



Export Q&A

More than 85% of Washington's wheat is destined for overseas markets, such as Japan, Taiwan, and the Philippines, where it will be made into noodles, cakes, and cookies. But how does the grain get from farmers' fields to consumers' plates half a world away?

Companies, such as United Grain Corporation, operate export terminals in areas where ocean-going vessels can dock to load (and unload) commodities. Most of the time, export terminals are located near a coast, often along a river or bay that is deep enough to handle these huge vessels.

United Grain Corporation (UGC) operates an export terminal in Vancouver, Wash., where they ship nearly 6 million metric tons of grains and oilseeds around the globe. Once a customer orders a shipment of grain, UGC sources that grain either from their own storage or from inland elevators. The grain is sent to the export terminal by train and barge and is then loaded onto a ship. The process sounds straightforward, but the logistics of finding the product the customer has ordered and getting it to Vancouver in time to meet the ship is anything but simple. UGC's Stephanie McClintock explained the process in more detail.

How do overseas customers place an order for wheat?

Buyers will usually solicit offers and UGC's merchandising team will work with overseas customers to negotiate sales contracts and terms.

When a customer orders a load of wheat, what options do they have?

Class of wheat, protein, amount, timing are all options. We follow U.S. grain standards for quality factors generally, but there are many options available for the buyer to get exactly what they want.

What is the time between when an order is placed, and when it is delivered?

That depends on when they want it to arrive. We generally sell orders about two months before the ship arrives for loading, then it takes about three weeks to sail to the customer, so it's an average of two to three months after the order is placed.

What is the average size of a wheat shipment?

Sales quantities can vary greatly, but an average wheat sale may be around 50,000 tons or 1.8 million bushels.

Does UGC generally store enough wheat to fill a customer's order?

We have the largest storage capacity of any West Coast export terminal, 8 million bushels. We can store enough to

load three or four big ships, but due to logistics, we always have a little of everything on hand, so we must coordinate the arrival of some product with the arrival of the vessel.

How does UGC work with inland elevators?

Inland elevators are the initial step in our supply chain. We strive to partner with producers in providing a market for their product. From the inland elevators, product is moved to our export terminal by either rail or barge.

Does UGC have contact with farmers?

Yes. Our team works with producers to provide them with market intelligence and strategies. We have a fleet of services we offer to help producers maximize their opportunities.



When you get a load of wheat in, what do you test it for?

When the wheat is first brought to the local elevator, it is tested for moisture, protein, impurities, and test weight to make sure it meets our requirements and to help identify how the wheat should be segregated in storage. Samples are then sent out for more complete grades. The wheat is again tested when it is loaded out of the local elevator and at least once more when the Washington State Department of Agriculture grades the wheat, at the export terminal, before it is sent to the purchaser.

What is blending, and why do you do it?

An overseas customer will ask for a certain level of protein, or specific grades factors, in the wheat, and we will blend different factors to meet the customer's request.

How do you separate and store wheat?

Our export terminal has over 250 storage bins, and we will separate based on grade factors.

Besides wheat, what else does UGC handle at the Vancouver facility?

UGC also handles soybeans, corn, sorghum, and canola. ■