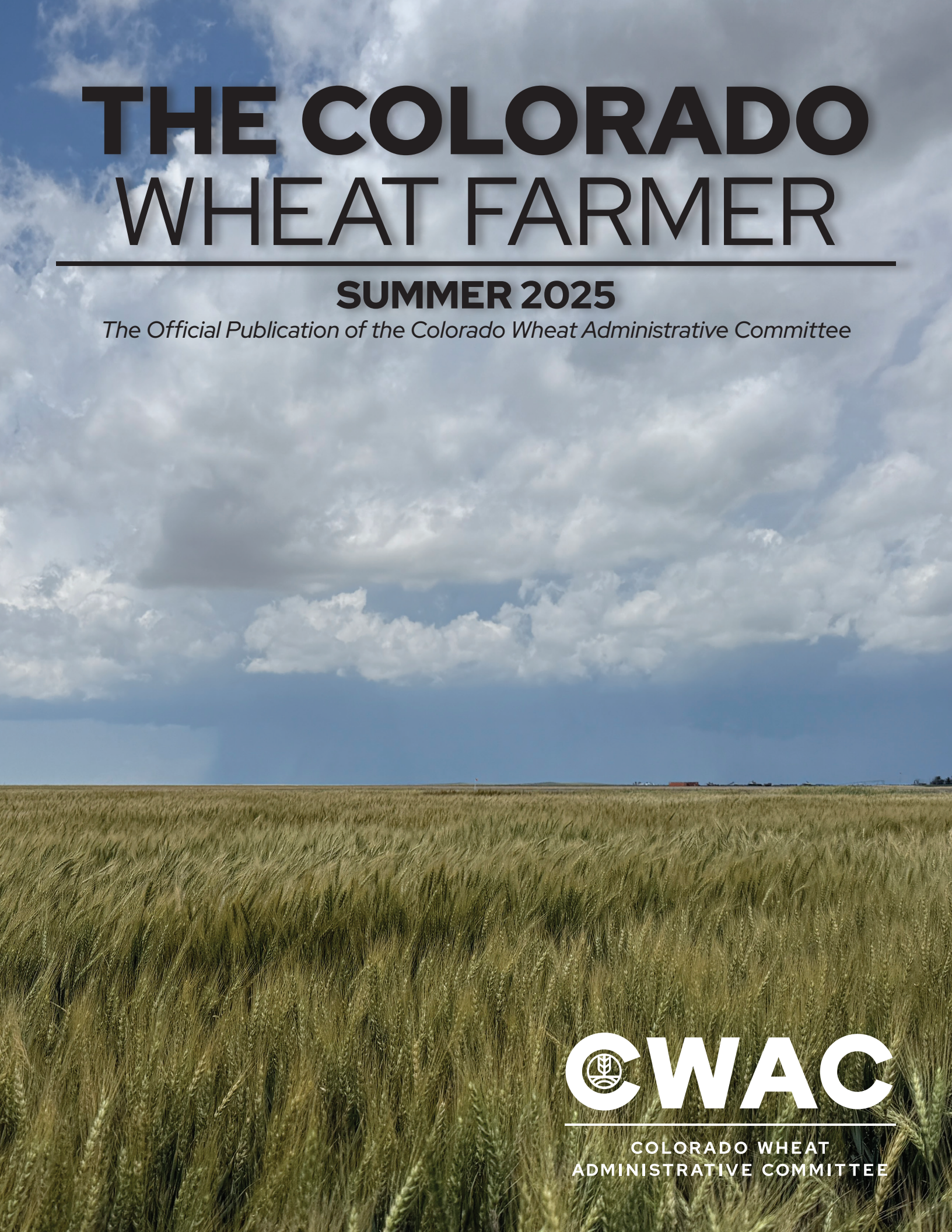

THE COLORADO WHEAT FARMER

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The Official Publication of the Colorado Wheat Administrative Committee

CWAC

COLORADO WHEAT
ADMINISTRATIVE COMMITTEE

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Cover Photo by Madison Andersen

IN THIS ISSUE:

HELP US UNDERSTAND THE ECONOMIC IMPACT OF THE WHEAT STEM SAWFLY ON THE COLORADO WHEAT INDUSTRY

Researchers from CSU Extension and the Department of Agricultural and Resource Economics are conducting a study, "Assessing the Economic Impacts of Wheat Stem Sawfly Populations on the Colorado Wheat Industry." If you've dedicated any of your production acres to wheat in recent years, we invite you to share your experiences on current and past decisions and management. Your input will help us understand how wheat stem sawfly has affected farming operations and guide future research, outreach, and policy. The survey takes 10 minutes to complete, and your responses are anonymous and confidential. Participation is voluntary, and you may exit the survey at any time. Complete the survey by August 20th for a chance to win a $100 Amazon gift card. Scan the QR code or go to https://tinyurl.com/ytv8h9z3

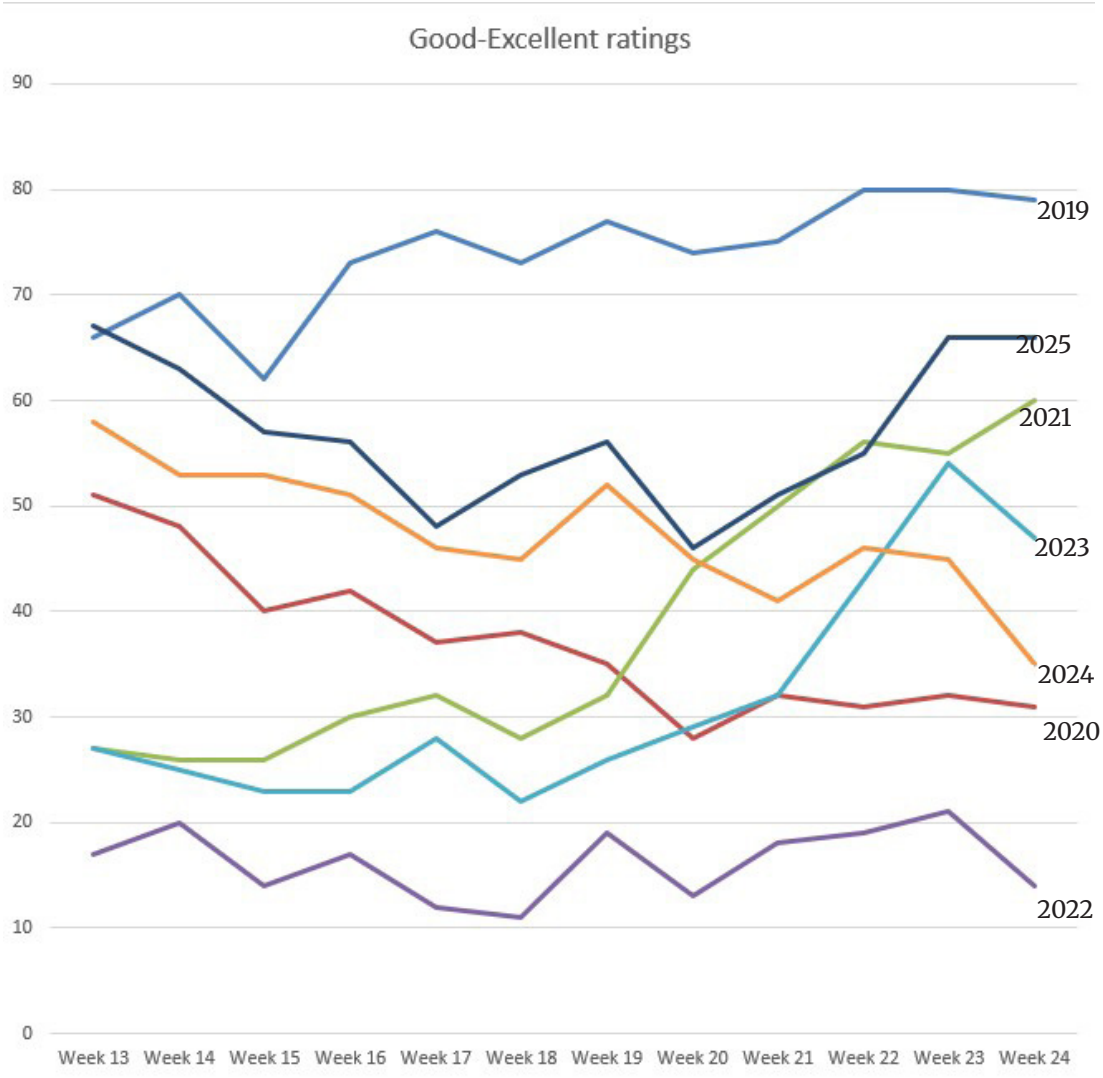
This project is led by Dr. Rebecca Hill (CSU Extension) and Sabina Regmi (Department of Agricultural and Resource Economics) and is funded by the Colorado Wheat Research Foundation.

PRESIDENT'S COLUMN

Jerry Cooksey

Greetings! After a fairly mild winter and a dry March and April, rain finally came in May. This time it brought rain to all of Eastern Colorado. According to the NASS data, this is the best start Colorado's wheat crop has had other than 2019. It's also worth remembering that 2019 was a bin-buster crop for Colorado, producing 98 million bushels.

The graph below compares the good-to-excellent ratings from the NASS Crop Conditions Reports over the past seven years, covering weeks 13 through 24 (end of March through mid-June). Can this graph predict the future? Probably not, but it does help provide some insight.



NASS released its estimated production numbers on June 12th. Based on conditions as of June 1st, NASS is predicting Colorado's 2025 winter wheat production to be 69.6 million bushels, with an average yield of 37 bushels/acre. (For reference, Colorado's 10-year average is roughly 72.5 million bushels.)

PRESIDENT'S COLUMN Continued from page 3

The CWAC Board of Directors met in late May and set the budget for the upcoming fiscal year. CWAC set the budget on a 65-million-bushel crop. It's important to keep in mind that this was planning for what we hope to be a worst-case scenario. This number was set before all of eastern Colorado received rain.

At the May meeting, the CWAC Board of Directors also decided to become full dues-paying members of U.S. Wheat for fiscal year 2025-26. The Colorado Wheat Administrative Committee (CWAC) has been paying half-dues to U.S. Wheat Associates since 2012, when drought forced budgetary constraints.

U.S. Wheat's mission is to "Develop, maintain, and expand international markets to enhance wheat's profitability for U.S. wheat producers and its value for their customers." It will be having many conversations about HB4 trait and the benefits of biotechnology with members of our industry and trading partners as it continues its mission. By fully supporting U.S. Wheat, Colorado wheat farmers stand to see increased benefits.

I hope everyone had a bountiful and safe harvest.

CWRF SIGNS AGREEMENT WITH BIOCERES FOR HB4 WHEAT

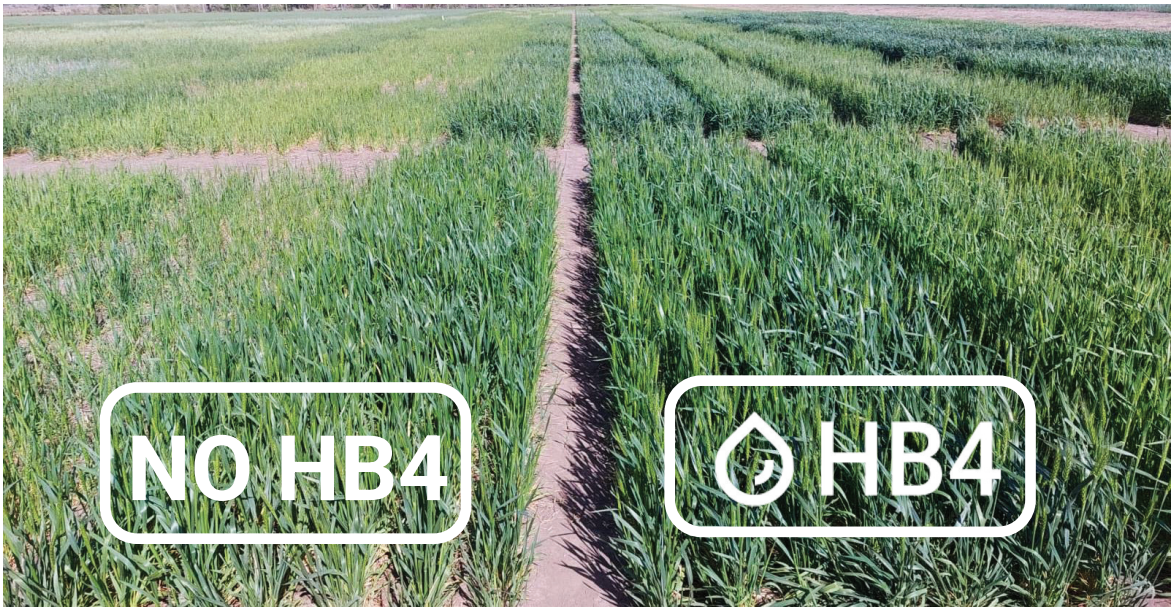
By Brad Erker - Colorado Wheat Executive Director

On July 31, the Colorado Wheat Research Foundation and Bioceres Crop Solutions Corp. (NASDAQ: BIOX) announced a strategic collaboration to jointly develop and commercialize HB4® wheat in the United States.

The agreement brings together Bioceres' proprietary HB4® technology, and CWRF's leadership in U.S. wheat innovation to establish a novel wheat production system that integrates drought tolerance and a new herbicide tolerance tool, offering wheat growers greater productivity and stability.

Under this agreement:

- Bioceres Crop Solutions grants exclusive, sublicensable, rights for the HB4® trait to CWRF in the United States;
- CWRF will act as Trait Manager, facilitating broad access to the HB4® trait for third-party breeding programs and commercial channels, as well as managing stakeholder relationships.
- Parties will engage with industry for the development, registration, and commercialization of novel, broad spectrum herbicide formulations for use with HB4® wheat. These formulations will be developed in combination with Bioceres' biological



A field trial in Pergamino, Argentina containing commercial isolines during the 2023 growing season.

solutions to implement an advanced herbicide system that supports grower performance, environmental safety and sustainable use.

HB4® wheat contains a trait from sunflowers that makes wheat more drought tolerant. Studies conducted by Bioceres in South America show an average 20% yield advantage with HB4 varieties at yield levels of 30 bushels/acre. The trait also carries tolerance to glufosinate herbicide.

Two phases of deregulation were required. The US Food and Drug Administration deregulated the HB4 drought-tolerant wheat trait for food and feed consumption in 2022. The USDA deregulated the HB4 on August 27, 2024, paving the way for its cultivation in the United States.

Deregulation by FDA and USDA does not mean farmers can immediately start growing this wheat. US Wheat Associates and the National Association of Wheat Growers have long discussed how GMO wheat could be commercialized. The "Wheat Industry Principles for Biotechnology Commercialization", printed on page 7, list several criteria that must be met first. Now that this agreement has been signed, work will begin to cover all of the points listed in those Principles. CWRF will play a key role in this process.

One of the most important requirements of the Principles is that, prior to the US moving forward with cultivation of HB4 wheat, regulatory approval for food and feed use must be met for all countries with 5% or greater market share of our wheat exports. This means that seven countries must make this approval: Japan, Mexico, the Philippines, South Korea, Taiwan, China, and Nigeria. Approval has already been granted in Nigeria, and BioCeres has made the application for the Philippines, but the other five still need to be applied for.

CWRF shared germplasm with Bioceres in October of 2022 to allow them to start putting the HB4 trait into varieties adapted to Colorado. These partially-converted varieties have now been returned to the US. They will be finished out to be the first

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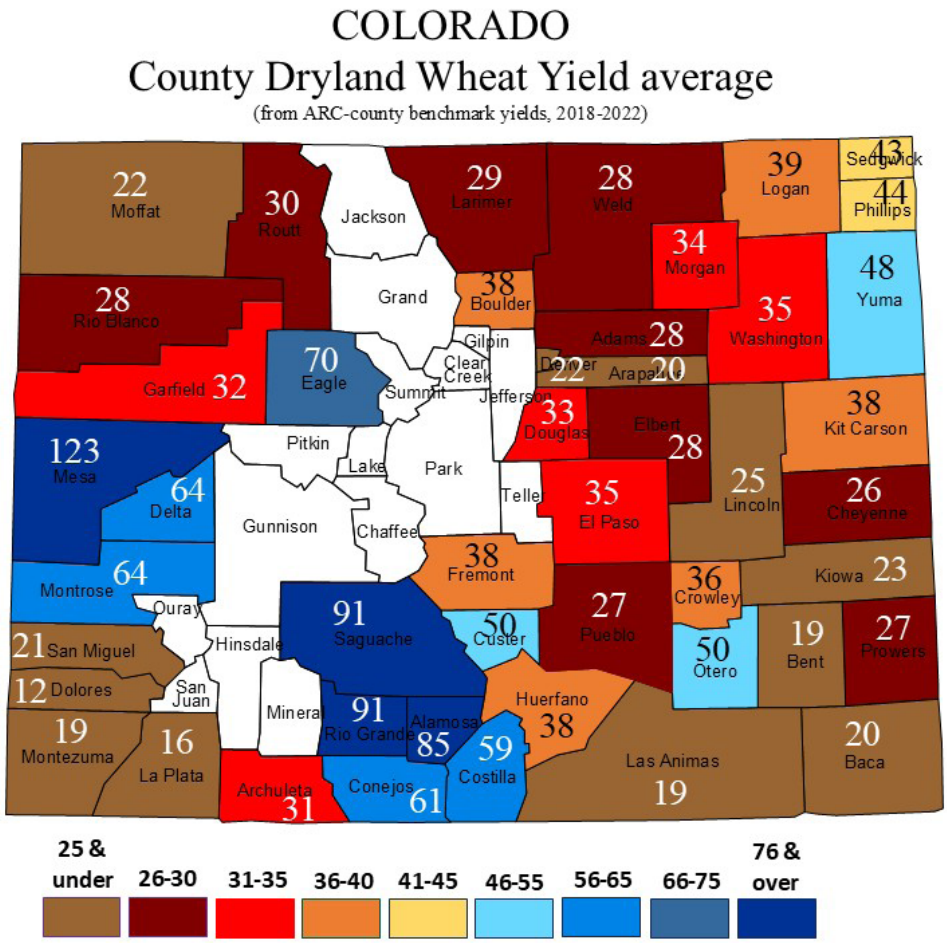
CWRF SIGNS AGREEMENT WITH BIOCERES FOR HB4 WHEAT Continued from page 5



HB4 winter wheat varieties that can be used for field testing to validate the trait, and also as donor lines for other wheat breeding programs to start breeding with the trait. CWRF will use a broad licensing approach for trait access, to allow both public and private wheat breeding program to introgress the HB4 trait into germplasm that will work across a wide geography.

This map shows average county wheat yields across Colorado. The data comes from ARC-County benchmark yields, representing a five-year timeframe from 2018-2022. The map shows that a trait which improves yield in the 30 bushel/acre range could have a large benefit to Colorado wheat growers.

Australian wheat growers are also taking a close look at HB4 wheat. The HB4 trait is currently in the deregulation process within Australia, with another 2-3 years needed before a decision will be finalized.

It's important to be clear that there is currently no GMO wheat being grown in the United States. Market considerations for grain are a major component of the decision-making process moving forward. It will be another 2-3 years before CWRF's first HB4 varieties are ready for field testing. While HB4 could be the first GMO technology available, it could 'kick the door open' for other GMO traits that could solve other wheat production challenges, whether that be fusarium head blight, virus issues, wheat stem sawfly, or perhaps help with consumer-oriented traits. The wheat industry will need to continue having conversations about the pros and cons of adopting GMO technology. CWRF's agreement to manage the trait makes commercialization more realistic and will enhance the seriousness of that conversation in the coming years.

WHEAT INDUSTRY PRINCIPLES FOR BIOTECHNOLOGY COMMERCIALIZATION

The U.S. wheat industry recognizes the benefits and value which could be created within the wheat chain through the prudent application of modern biotechnology. U.S. wheat producers will support commercialization of transgenic wheat traits after thorough review and development of a commercialization plan that facilitates commercialization with minimal market disruption. We support the ability of our customers to make purchases based on their preferences for specific traits, classes, qualities, and characteristics. We will work diligently to assure that commercially achievable customer preferences are met.

The U.S. wheat industry will support commercialization of transgenic wheat traits when:

1. The technology provider initiates an informative dialogue with the USW/NAWG Wheat Breeding Innovation Committee (WBIC) prior to submitting for regulatory approvals in the U.S. This dialogue will allow our organizations to initiate education and outreach activities to both domestic and international customers, and to provide the technology provider with practical information intended to facilitate commercialization with minimal or no market disruption.

2. Regulatory approvals for food and feed use must be secured in major wheat export markets that will be affected where a functioning regulatory system exists. Major export markets are defined as those which represent at least five percent of the normal export volume of U.S. wheat, based on a five year moving average at the time a provider begins the regulatory process in the United States. In countries where there is no viable regulatory approval system, technology providers will make regulatory submissions promptly when those systems become functional.

3. Commercialization of the trait must not impair the ability of non-transgenic wheat to meet commercially recognized thresholds for the low-level presence of transgenic traits. Appropriate international tolerances for transgenic wheat in non-transgenic shipments must be established and accepted in major export markets.

4. An accurate, economical and timely trait detection test must be provided by the trait developer prior to commercialization.

5. The primary responsibility for education and outreach for new traits will remain with the technology provider. USW and NAWG will actively help seek buyer acceptance and will provide guidance, assistance and resources.

6. The technology provider must demonstrate stewardship of the technology, including education and outreach to growers to assure compliance with agronomic and grower stewardship practices specific to the trait.

7. We have examined both certified seed and point-of-delivery value capture models. While there are advantages and disadvantages of either approach, we believe the certified seed model will be most acceptable to the value chain and is the preferred approach. Investment in agricultural technology by private parties requires a return on that investment. We support the protection of intellectual property, including education about the importance of complying with seed and stewardship contract provisions and enforcement of those provisions when necessary. Technology traits should be encouraged for adaption into public wheat varieties.

Adopted November 2008, Revised January 2015, November 2018

SECTION 301 ACTIONS AND TARIFFS

By Ralph Loos - U.S. Wheat Associates

A change in administrations always brings with it adjustments that have potential to affect trade, so U.S. Wheat Associates (USW) has spent the first half of 2025 keeping a close eye on moves made in Washington, D.C. and around the world.

An overhead view of a Gulf Port Elevator. Photo Courtesy of U.S. Wheat Associates.

Proposed Section 301 actions targeting China's shipbuilding industry could have dealt a painful blow to the U.S. wheat industry. Initially, the proposed actions – Chinese vessel operators and owners were to be subject of fees based on net tonnage for each shipment – did in fact dampen export sales.

The U.S. wheat industry and its customers depend on ocean-going vessels, especially dry bulk carriers, and exports are vital to U.S. farmers' role of helping feed the world. About half of the U.S. wheat crop is exported each year.

But on April 17, after considering Federal Register comments and public input, the office of the U.S. Trade Representative (USTR) issued final determinations on the Section 301 actions. It was determined USTR would implement phased fees. Importantly, Chinese-built bulk vessels under 80,000 tons deadweight or those arriving empty in the U.S. are exempt. The good news: U.S. wheat shipments around the country are expected to be exempt from significant impacts.

The reconsideration of the proposal, which would have significantly increased export costs for U.S. wheat, was a welcome relief for the industry.

"This move means a lot to farmers and customers around the world," said USW Chairman Clark Hamilton, a wheat farmer from Ririe, Idaho. "We want to thank them for their efforts to balance the need for action against these Chinese maritime practices with the potential for harm to our export competitiveness."

While additional tariffs are always a concern, they have not had an impact on U.S. wheat so far this year. U.S. wheat competitiveness has steadily increased throughout 2025. U.S. Gulf hard red winter (HRW) remains competitively priced against other

origins, including French, Argentinean, and Ukrainian wheat, and below competing wheat classes from Russia, the Baltic Sea, Germany, and Poland on a Free on Board (FOB) basis. U.S. soft red winter (SRW) has been the most competitive global origin since early March 2025, the longest competitive window since before the Russian invasion of Ukraine. U.S. soft white (SW) is a close second.

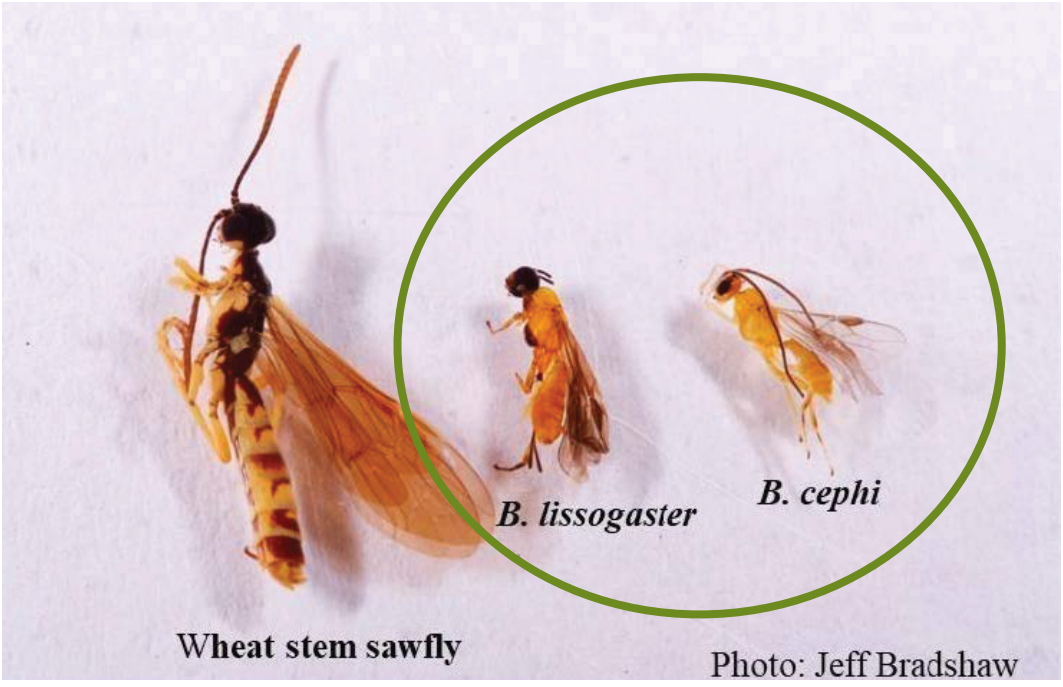
From early March 2025 to Mid May, SRW maintained its position as the most competitively priced global origin. This marks the longest period of competitiveness since before the Russian invasion of Ukraine. Although new crop Russian and Ukrainian wheat prices have decreased aggressively in recent weeks, SRW and Gulf HRW still remain within a close range of Black Sea supplies. As of June 27, SRW sits within $2/MT of Ukrainian wheat and $5/MT below Russia wheat, while Gulf HRW 11.5% hovers at near parity with competing origins from Argentina, France, and Romania.

As farmers spend hours upon hours in the field during the 2025 winter wheat harvest, the USW Trade Policy Team continues to monitor actions in the nation's capital that could impact trade and wheat exports.

USW's goal remains clear: to help American farmers feed the world.

INSECT WARFARE –THE BENEFICIAL BUG BALER PROJECT

The wheat stem sawfly causes approximately $33 million in annual damage to Colorado's wheat crop, making it one of the biggest issues in Colorado's wheat industry. While semi-solid varieties have recently been introduced to help mitigate this pest, relying on a single trait is not a sustainable long-term solution.



Bracon parasitoids are native parasitoid wasps that kill sawflies as part of their life cycle.

Researchers from Colorado State University, the University of Nebraska-Lincoln and

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BENEFICIAL BUG BALER PROJECT

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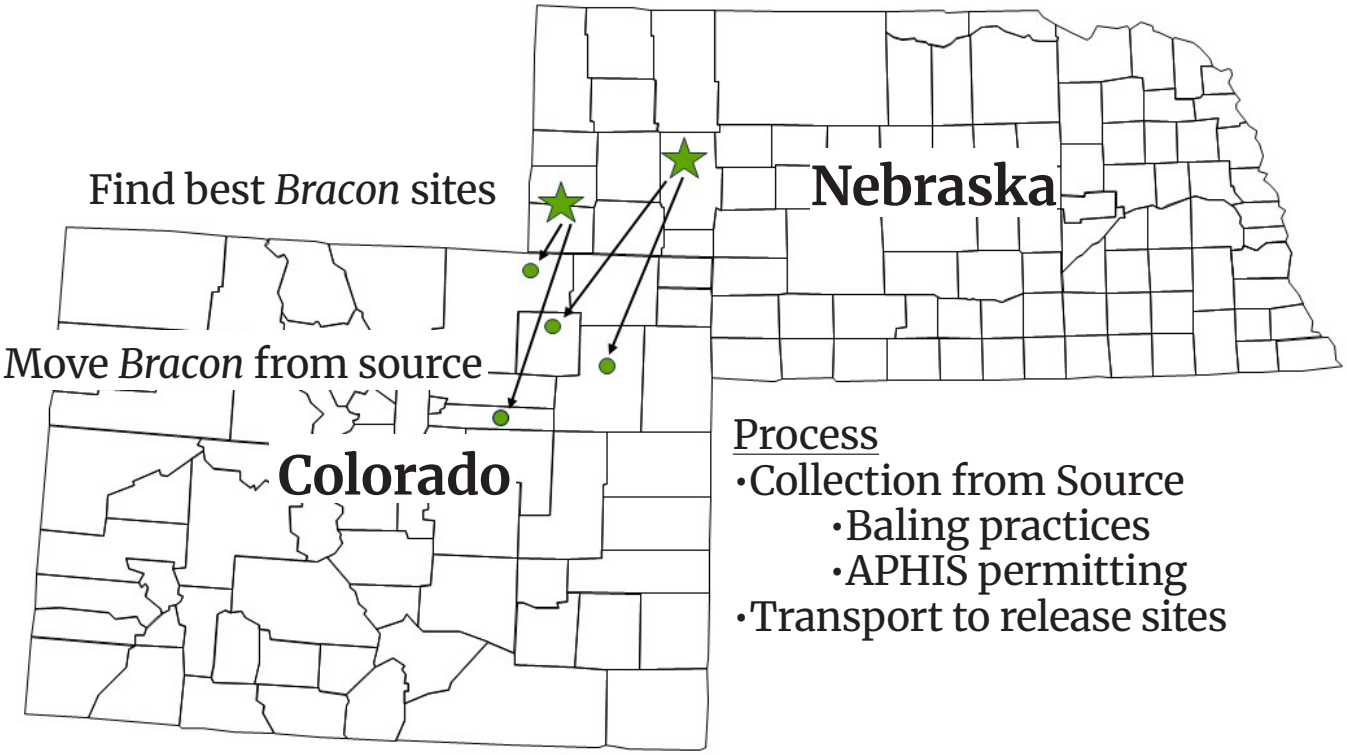

USDA-ARS have recently started to test a biological control method. Their focus is on Bracon parasitoids, a natural enemy of the Wheat Stem Sawfly. The main difference between a parasite and a parasitoid is their effect on the host. Parasites typically don't kill their hosts, while parasitoids, ultimately kill the host. Parasitoids are a specialized type of parasite where the immature stages (larvae) live on or in a host organism, eventually leading to the host's death.

The way Bracons attack Wheat Stem Sawfly is quite remarkable. The Bracon adult female wasp locates a sawfly larva in a wheat stem; paralyzes it by inserting an egg-laying tube into it; and lays one egg per sawfly larva. This egg then hatches, and the Bracon larva feed on the sawfly larvae, eventually consuming and killing it. There are two Bracon species that attack sawflies- Bracon cephi and Bracon lissogaster. B. cephi is more commonly found than B. lissogaster. Research has shown that B. cephi has a high parasitism rate, and their parasitism can decrease Wheat Stem Sawfly-related stem injury. Some areas of Montana and Nebraska have high enough levels of B. cephi to provide significant control of Wheat Stew Sawfly, at least some of the time. However, after surveys were taken, it was found that Colorado has extremely low Bracon populations in wheat.

Researchers knew action needed to be taken to help establish Bracon populations in Colorado wheat fields, so they created the Beneficial Bug Baler Project (BBB Project). The goal of this initiative is simple - introduce and establish native Bracon parasitoids in Colorado wheat fields.

The UNL High Plains Agricultural Laboratory in Sidney, NE had already completed research to see if Bracons could help reduce Wheat Stem Sawfly pre-lodging injury and help protect yield. This research found a significant reduction in wheat stem injury when parasitism was more than 50% (when more than 50% of wheat stem sawfly larvae found within stems are also infected by a Bracon). It also showed that greater than 50% parasitism recovered nearly 100% of head weight damage caused by the sawfly.

CSU and USDA-ARS staff unfurl parasitoid bales at Colorado locations. Photos provided by Pete Kleinman and Cody Hardy.

After the success of this research, 11 bales of wheat straw containing Bracon larvae were transferred from the UNL High Plains Agricultural Laboratory (HPAL) in Sidney, NE to the USDA-ARS Central Great Plains Field Station in Akron, CO, in the fall of 2023. Because adult Bracon wasps thrive in wild and perennial grass habitats that provide pollen and nectar resources, the bales were unrolled in nearby grasslands adjacent to winter wheat fields at the research station. Researchers set out traps during emergence in the spring and also collected wheat stems prior to harvest to verify the Bracon survived transport and became established in their new environment. They also collected stems post-harvest to see if parasitism from the Bracon on the wheat stem sawfly had occurred.

Overall, the results were encouraging. Stems collected post-harvest showed levels of parasitism. The research is continuing with the 2025 crop, as more bales with Bracon cephi larvae were spread at three locations across northeast Colorado, New Raymer, Orchard and Byers. Researchers will continue to monitor parasitoid emergence and their impacts on sawfly infestation throughout the growing season. This work is partially funded from CWRF royalty funds collected on the sale of Certified seed.

There's still a lot to learn about the B. cephi parasitoids. For example, what landscape factors influence their establishment, and what habitats or agricultural practices promote population increases? Ultimately, the Beneficial Bug Baler Project aims to answer these questions and foster the establishment of Bracon nurseries to help build populations in Colorado wheat fields.

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