

FALL 2020

# SOYBEAN NEBRASKA

A Publication of the Nebraska Soybean Association and the Nebraska Soybean Board

## SUSTAINING CONNECTIONS

Strategies for an adapting world. Our international marketing programs work to bolster Nebraska soybean demand.

Learn more on pages 12-20.

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In the wake of the pandemic, Soybean Management Field Days is going online for 2020.

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Read how Nebraska researchers are thinking big and improving soybean germplasm for aquaculture.

Nebraska Soybean Association  
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## BRENT WOLKEN

**DEKALB® ASGROW® BRAND TECHNICAL AGRONOMIST**  
Pierce, Nebraska

*Seeds and agronomy. They're the one-two punch for improving performance in any field. That's why farmers in northeast Nebraska rely on DEKALB® Asgrow® technical agronomist Brent Wolken for management advice. He's been working in the region over the past year and is a great source for local knowledge. Here he addresses some of this year's pressing management questions.*

# ASK AN AGRONOMIST

## WHAT ARE SOME PRACTICES FOR MANAGING LATE-SEASON IRRIGATION IN SOYBEANS?

Late-season irrigation management for soybeans is a very critical component for capturing higher yields in soybeans as well as keeping irrigation costs down and capturing good ROI. August is a very critical month for soybean pod development, and it is important that we maintain adequate soil moisture levels while not overwatering. Once soybeans reach the R4 stage, which is the end of pod elongation, soybeans need approximately 9 inches of water to reach full maturity. It is important that we monitor the soil-holding capacity and irrigate when necessary but be sure not to over-irrigate, as we then lose efficiency and waste dollars on irrigation cost that will not be recouped in higher yields. This is always where the use of soil water probes and the knowledge of different soil types and their holding capacities become very important.

## WHAT ARE SOME STEPS TO HELP SUPPORT LATE-SEASON DISEASE AND PEST CONTROL?

Late-season disease and pest control can also be a key factor in capturing a soybean crop's full yield potential. Diseases such as white mold and frogeye leaf spot can be very detrimental to a soybean crop and need to be handled in a preventative manner. Many times, a disease like white mold does not show any symptoms in the plant until it is too late to treat for it. A good treatment

consists of using a fungicide with multiple modes of action that has activity against the white mold pathogen. The same can be said of late-season pest control, which in our case in northeast Nebraska is predominantly aphids. Aphids typically

**AUGUST IS A VERY CRITICAL MONTH FOR SOYBEAN POD DEVELOPMENT, AND IT IS IMPORTANT THAT WE MAINTAIN ADEQUATE SOIL MOISTURE LEVELS WHILE NOT OVERWATERING.**

arrive in early to mid-August as they move south out of Minnesota and the Dakotas. A good combination of insecticides that contain both knock-down and systemic activity are key in managing these late-season pests.



FIND MORE  
AGRONOMIC  
UPDATES AND TIPS  
AT **ASGROW.COM/  
PLANTING**

**ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS.** Performance may vary, from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields.

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The Nebraska Soybean Association (NSA) and the Nebraska Soybean Board (NSB) are proud to share the FY21 Fall edition of this publication with you—members of our shared community.

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The Nebraska Soybean Board is a private, nonprofit checkoff board responsible for the research and promotion of soybeans in an effort to increase the profitability of the state's 22,000 soybean producers.

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#### District 5

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#### District 6

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#### District 7

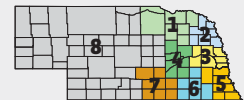
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## On The Cover

Farmers are finding new ways to connect with buyers and consumers around the globe.

Photo Credit:  
Thomas Hoxmeier



## Note from the **EXECUTIVE DIRECTOR**



*By Scott Ritzman*

This issue of SoybeanNebraska features some Nebraska Soybean Board (NSB) international marketing investment activities.

Over the last few years, diversifying our export markets has been a big focal point of the board. We grow the highest quality soybeans in the world, and with superior transportation infrastructure, we look to supply the global demand soy products.

Today, 60% of U.S. soybeans are exported as beans, meal and oil. Working with our industry partners, we continue to create a strong demand for soybean and soybean products. Soybeans provide an excellent source of protein for animals as well as human protein.

U.S. soy holds a strong competitive advantage when it comes to sustainability, quality and reliability. Trade uncertainty with China has brought about success in emerging markets, especially in the Middle East/Asia Subcontinent (Egypt, Pakistan and Bangladesh) as well as European countries.

We also continue to see great return on investment with exporting Nebraska soybeans through red meats. In 2019, pork exports added 9% of bushel value. U.S. pork exports used 2.12 million tons of soybean meal, which is the equivalent of 89.2 million bushels of soybeans.

NSB will continue to build strong relationships through our partners with customers around the world and remind them of the superior quality soybeans you raise in Nebraska.

Have a safe and prosperous harvest season!

## View from the Chair

# ADAPTING FOR SUCCESS



*By Eugene Goering  
Nebraska Soybean Board Chairman, Columbus*

As I write this piece, harvest is rapidly approaching. Our field scout predicts our first soybean field will be ready to harvest in the first third of September. We planted group 2.4 in late April to get started early, and we have one field of seedcorn out in August. I wish everyone a safe and bountiful harvest—I know the weather has taken a toll on yields in some areas.

The Nebraska Soybean Board (NSB) has needed to adjust to the COVID-19 environment. Zoom is now much more than the sound of children's toy cars—we have made changes in how we meet and work but continue the programs to improve soybean farmers' profitability.

This year, Soybean Management Field Days are virtual and plans to share this program are continuing. We are staying connected with foreign grain buyers online and a Nebraska harvest tour video is being shared with them.

NSB past and current checkoff investments continue to find homes for soybean meal and soybean oil. Biodiesel use is strong all across the country, and we see even larger use ahead. In-state livestock, including Lincoln Premium Poultry, are using large volumes of meal in their rations from Nebraska soybean farmers. Aquaculture is poised for domestic growth in catfish, salmon, trout and shrimp. We also invest in research projects to increase yields, manage pests and control costs—all to serve our Nebraska soy growers.

I also want to congratulate the candidates that won three-year terms to serve on the board. We also thank the other candidates who put in the effort to run and, finally, the growers who voted.

Harvest is started and the pandemic lingers, but through it all, the NSB staff and board continue to invest your checkoff funds to benefit Nebraska soybean farmers.



From the Association

# SOYBEANS IN THE SPOTLIGHT

By Shane Greving, NSA President



The 2020 legislature was definitely one of a kind. The final day of the session officially came to a close on Aug. 13. Within the final days of session the main priority for the Nebraska Soybean Association (NSA) was Property Tax Relief, and through much debate and numerous revisions, property tax relief got the green light on the passage of LB 1107. Getting this bill over the finish line was a group effort by many ag organizations and other business interests. Hard work and long hours were put into fine tuning LB 1107 by members of the Revenue committee and other state senators.

Property tax bill LB 1107 was the compromise bill that included property tax relief through a refundable income tax credit, along with putting a floor of \$275 million in the current property tax credit fund (PTCF). The new property tax relief fund includes an initial \$125 million in 2020, with subsequent years adding to the fund to a total of \$375 million at least by 2024.

Agriculture will receive its share of the new funds based on school taxes paid on real property. While the relief may seem like a minimal amount to a producer in 2020, that amount grows to around 15%

by 2025—that's a step in the right direction. The big, ongoing issue is addressing school funding and the reliance on property taxpayers. I'm certain that will be a topic for the 2021 session we will work on.

Broadband bills signed into law were LB 992 (Sen. Curt Friesen) which incorporates the recommendations of the NE Rural Broadband Task Force for statutory changes and LB 996 (Sen. Tom Brandt) which creates the Broadband Data Improvement Program to ensure that Nebraska is accurately represented in federal broadband grant programs.

As we approach the final leg of the campaign season, I urge you to get involved and get to know the issues and candidates that are running in the local and state races. The voice for the rural route citizen and our issues needs to be amplified. We need a solid voice to help represent ag and our interests. The NSA will continue to work at both the state and national level on the policy issues impacting soy growers. Thank you for your membership support that helps us represent you.

As the fall harvest season is here, remember to take your time, stay safe and stay healthy.

## Lawmakers Pass Property Tax Relief—Still Work To Do

On the final day of the 2020 Legislative Session, State Senators passed LB 1107 in which a component provides substantial property tax relief for ag producers. The Nebraska Soybean Association acknowledges the State Senators that worked tirelessly until the final day to see to it property tax relief was included.

What does LB 1107 mean for soy growers? The average Nebraska farm paid property taxes to schools on land, buildings and farm sites of approximately \$14,850 in 2019. Under LB 1107, this same average farm would be eligible for a credit providing relief of roughly \$855 in 2020. By 2025, the credit and relief would grow to around 15 percent of school taxes paid, or \$2,227. School funding reform and the reliance on property taxes will continue to be a priority heading into the 2021 Legislative Session.



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## MEET THE ELECTED NEBRASKA SOYBEAN BOARD MEMBERS

The Nebraska Soybean Board held an election in July for board members in Districts 5 and 7 as well as the At-Large position, and soybean farmers in those districts voted to elect with the following results while the sitting board voted on the At-Large candidates.



5

**DISTRICT 5**  
**Brent Steinhoff**

"I am very excited to join the Nebraska Soybean Board and represent District 5. I greatly look forward to working with the other board members and making the best decisions for the benefit of Nebraska soybean farmers."



7

**DISTRICT 7**  
**Doug Saathoff**

"I am excited to be re-elected to the Nebraska Soybean Board. I am looking forward to helping soybean farmers by working with my fellow board members to solve problems and meet the challenges that are facing Nebraska soybean producers. Investing soybean checkoff dollars wisely and efficiently will be a top priority of mine."



AT-LARGE

**AT-LARGE**  
**Greg Anderson**

"I am honored to be re-elected to serve another term on the Nebraska Soybean Board and work with fellow board members to invest checkoff dollars in those projects that bring the greatest return to Nebraska soybean farmers. I look forward to helping create demand and market opportunities for Nebraska soybeans."

The elected board members will serve a three-year term beginning October 1, 2020, and ending September 30, 2023.

“ A special thank-you to all the candidates who took time out of their busy schedules to run in this year’s election. Our industry will continue to face many challenges, but I am excited to see how our board will seek opportunities that will benefit all soybean farmers in Nebraska.

— SCOTT RITZMAN, NEBRASKA SOYBEAN BOARD EXECUTIVE DIRECTOR

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# HONING IN AT HARVEST TIME

UNL's Dr. Jim Specht outlines three key considerations for soybean farmers this fall.



## Scouting for Pests Before Harvesting

Two particular soybean pests, if severely infesting your fields, can have the greatest impact at this time of year. First, soybean stem borer can lead to stems falling below the reach of your combine cutter bar because its larva tunnel down the stem. If they make it far enough, reaching the bottom of the stem, it can cause the plant stem to break and collapse to the ground.

"Producers will want to scout fields to determine which fields have stem borer," Dr. Specht said. "Try to harvest those infected fields first and as soon as possible—maybe even at a higher seed moisture range—to reduce the risk of a windy day happening before combining the field."

Soybean gall midge is the other pest to monitor closely because its larvae also weaken stems by consuming the plant tissue to the point that it snaps or falls.

"This pest has recently become a serious problem in eastern Nebraska, progressing into fields after getting a start in areas located along the field edges," Dr. Specht added.

The Nebraska Soybean Board is funding research with UNL to help deter soybean stem borers and gall midge.



## Measuring for Moisture and Loss

Ideally, you want to have your fields' moisture range to reach 13–15% by harvest. This maximizes seed weight and minimizes field loss, whereas harvesting with too little moisture can be costly.

"If you deliver soybeans at less than 13%, the soybean seeds will weigh less relative to the weight of seeds that have the fully allowable 13% water content," Dr. Specht said. "In addition, harvesting soybeans at low seed moisture can lead to more combine shattering loss at the header and a greater percentage of split seeds passing through the cylinder."

On top of measuring for moisture, measure harvest losses to improve your combine settings and speed. Stop your combine in your field, back up to where straw was ejected and then count the seeds in your pre-cut area, post-cutter bar area and post-combine straw area. Counting the unharvested beans will help you approximate your loss—4 seeds per square foot equates to about one bushel per acre.

"Timely harvest will decrease pre-combine losses, like in-field shattering," Dr. Specht said. "Proper setting of the combine cutter-bar and reel position and speed will reduce seed loss at the cutter-bar, and proper setting of the combine blower and straw walker sieves will reduce seed loss in the straw that exits the combine."



## Getting Cover Crops in the Ground

If you use winter annual cover crops, like cereal rye, you will want to prioritize planting immediately after harvest. The more time the cover crop has to grow, the better protection it can provide your fields.

"The earlier the cover crop is planted in fall, the more likely it can grow sufficiently before winter temperatures shut down growth to offer off-season reduction of wind and water erosion, notably so in soybean fields," Dr. Specht said.

But even the best laid plans often go awry. Weather and timing can be unpredictable and will ultimately determine when harvest is realistic. If planting cover crops, be ready to plant them as soon as you can after harvest.



### More information about cover crops can be found at:

- ▶ [nebraskasoybeans.org/production-resources/planting](http://nebraskasoybeans.org/production-resources/planting)
- ▶ [cropwatch.unl.edu/cover-crops](http://cropwatch.unl.edu/cover-crops)
- ▶ [sare.org/resources/cover-crop-economics/](http://sare.org/resources/cover-crop-economics/)



For more production insights, subscribe to CropWatch, the crop production newsletter from UNL's Institute of Agriculture and Natural Resources, at [CropWatch.UNL.edu](http://CropWatch.UNL.edu).





# PLOTTING A VIRTUAL EXPERIENCE

In the wake of the pandemic, **Soybean Management Field Days** is going online for 2020.



“ Growers can obtain ideas and insight about the challenges they face in producing a quality crop at a profitable price in today’s global economy.

— KEITH GLEWEN, NEBRASKA EXTENSION EDUCATOR

For over 20 years, Soybean Management Field Days (SMFD) have helped soybean growers maximize productivity and profitability through smart decisions and efficient use of resources. This year’s event—even though in a different format—aims to continue that tradition.

Because of COVID-19, the 2020 installment of SMFD will be held online. While we weren’t able to offer in-person field days this year due to the pandemic,

we are excited to bring you the event in a virtual format.

We’ve been actively keeping the SMFD plots up and running and conducting research to share with growers. Nebraska Extension specialists and educators are providing SMFD presentations and growers can view them online at a time that is convenient to them. We hope that you will find the information and materials presented valuable to your operation.

“

We are committed to sharing research-based information to improve soybean profitability while protecting soybean growers' health and safety. Learning to adapt has been a theme this year and we want to continue finding new ways to build value for farmers.

— **SCOTT RITZMAN, NEBRASKA SOYBEAN BOARD EXECUTIVE DIRECTOR**

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Most of the SMFD presentations were recorded in August at the Shelby field site in an effort to bring you a true virtual field day experience. SMFD research for this year's event was conducted at:

- Jerome Fritz Farm (Hildreth)
- Kevin Dinslage Farm (Elgin)
- Bart and Geoff Ruth Farm (Shelby)
- Mike Fuchs Farm (Arlington)

Nebraska Extension specialists and educators have provided presentations that you can view whenever and wherever is most convenient. As you view the presentations, please follow along with the link to the grower booklet, as further details and information are available. Together, the presentations and booklet provide updates from the sites as well as information to help growers stay current and competitive in the global marketplace and increase profits.



## 2020 Soybean Management Virtual Field Days

THIS YEAR'S TOPICS INCLUDE:

### > Precision Ag Technology and Online Budgeting: What are the Economics?

*Presented by*

**Glennis McClure**, Nebraska Extension Farm and Ranch Management Analyst

**Taro Mieno**, UNL Department of Ag Economics Assistant Professor

### > Strategies for Soybean Gall Midge and Insect Management in Cover Crops

*Presented by*

**Tom Hunt**, Nebraska Extension Entomologist

**Elliot Knoell**, UNL Entomology Research Project Coordinator

**Justin McMechan**, UNL Crop Protection and Cropping Systems Specialist

**Robert Wright**, Nebraska Extension Entomologist

**Tamra Jackson-Ziems**, Nebraska Extension Plant Pathologist

**Asha Mane**, University of Nebraska Graduate Student

### > Drill-Interseeding Cover Crops in Soybean

*Presented by*

**Chris Proctor**, Nebraska Weed Management Extension Educator

**Katja Koehler-Cole**, UNL Research Assistant Professor

### > Soybean Production & Cover Crops — Planting Rates, Row Spacing, Planting Dates, Maturity Groups and Irrigation Management

*Presented by*

**Steve Melvin**, Nebraska Extension Educator, Cropping Systems

**Aaron Nygren**, Nebraska Extension Educator, Cropping Systems

**Jim Specht**, UNL Emeritus Professor of Agronomy and Horticulture



Check out the Soybean Management Virtual Field Days at:  
**[enrec.unl.edu/2020SoyDaysVideo](https://enrec.unl.edu/2020SoyDaysVideo)**



# FULL-CIRCLE RETURN

**HERE'S HOW THE SOY CHECKOFF WORKS.** The national soy checkoff was created as part of the 1990 Farm Bill. The Act & Order that created the soy checkoff requires that all soybean farmers pay into the soy checkoff at the first point of purchase. These funds are then used for promotion, research and education at both the state and national level.



\* Led by 73 volunteer soybean farmers, the United Soybean Board (USB) invests and leverages soy checkoff dollars to MAXIMIZE PROFIT OPPORTUNITIES for all U.S. soybean farmers.

[unitedsoybean.org](http://unitedsoybean.org)





# Growing Value UNDERWATER

**New study shows expanding the U.S. aquaculture industry would prove beneficial for soybean farmers.**

**S**oybeans are a vital component in the diet of aquatic animals raised to become seafood.

For catfish, baitfish and tilapia, as much as 51% of their diet can come from soybeans while crappie, sunfish and both smallmouth and largemouth bass aren't far behind at 48%.

U.S. soybeans are sought after by international aquaculture industries, but at home it's a different story—90% of the nation's seafood is imported. Since exporting can be much more volatile, growing domestic aquaculture business would give soybean farmers a reliable, promising destination for their crops.

That's the crux of the recent study, "Potential Economic Value of Growth of U.S. Aquaculture to U.S. Soybean Farmers," authored by Carole R. Engle (Engle-Stone Aquatic\$ LLC), Ganesh Kumar (Mississippi State University) and Jonathan van Senten (Virginia Tech University's Virginia Seafood Agricultural Research and Extension Center). It was funded by the Soy

Aquaculture Alliance (SAA) with the help of soybean checkoff dollars and state soybean boards.

"An increased domestic market for soybeans would add stability that would reduce market and price risk," the report's executive summary states. "Increased demand for soybeans from aquaculture would further serve to strengthen rural farming communities."

The study estimated current soybean usage in U.S. aquaculture and how increased demand could stimulate expansion. Then, using data, scenarios illustrating the best route to growing aquaculture were developed, showing how it all leads back to improving the livelihoods of soybean farmers.

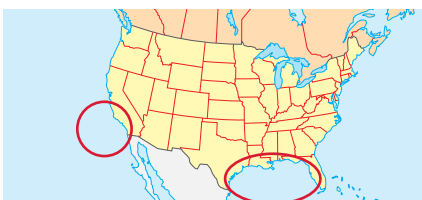
The findings indicated that catfish was the aquaculture segment with the greatest possibility for soybeans, and eased regulations would encourage even more growth.

The report summarized that greater domestic aquaculture can benefit



**Read the full research report at [SoyAquaAlliance.com/research-reports](https://SoyAquaAlliance.com/research-reports).**

soybean farmers because U.S. aquafeeds source feed ingredients within the country and their diets rely on a greater percentage of soybeans than land-based animal agriculture. As ancillary benefits, better domestic aquaculture would strengthen rural farming communities and soybean crushing mills; diversify markets and stabilize U.S. soybean demand; positively affect soybean prices; and increase U.S. food security.



Efforts to improve seafood security and aquaculture opportunities in the United States are moving forward. NOAA Fisheries announced federal waters off southern California and in the Gulf of Mexico as the first two regions to host Aquaculture Opportunity Areas. The selection of these regions is the first step in a process designed to establish 10 Aquaculture Opportunity Areas nationwide by 2025. These two regions were selected for future aquaculture opportunity area locations based on the already available spatial analysis data and current industry interest in developing sustainable aquaculture operations in the region.

## INTERNATIONAL MARKETING

# SUSTAINING CONNECTIONS

**The Nebraska Soybean Board connects the state's soybean farmers and their crop to markets overseas and across borders through value-driven alliances, technology and programs.**

**13 | Building Connections Around the Globe**

COVID-19 has spurred creativity for staying connected.

**14 | Behind the Crush**

Take a behind-the-curtain look at how a processing plant operates.

**15 | Supply Chain of Communication**

Partnership is helping Nebraska farmers keep in touch with export customers.

**16-17 | Pivoting During the Pandemic**

Virtual conferences have proved valuable for U.S. Soy in 2020.

**18-19 | Helping Set the 'World's Table'**

A USMEF partnership extends the reach of American pork products.

**20 | Educating Near and Far**

USAPEEC is targeting markets in India and Mexico for eggs and poultry.

### INTERNATIONAL MARKETING COMMITTEE

From left to right, committee members Daryl Obermeyer, Anne Meis and Clay Govier and chair Nathan Dorn.



# Building Connections AROUND THE GLOBE

Even amidst the pandemic, the NSB's International Marketing Committee is working to expand its reach.

**C**OVID-19 has halted travel, but it hasn't stopped the Nebraska Soybean Board (NSB) from continuing its work worldwide.

A greater use of technology has helped the NSB's International Marketing Committee bridge the gap as best it can. Even though 2020 has been anything but business as usual, connecting with customers around the globe in virtual settings has offered new opportunities.

"While the pandemic has brought challenges, we can see increased opportunities in technology, virtual trade relationships and communication," said Nathan Dorn, the 2019–20 committee chairman. "Being able to connect with someone across the globe is valuable, and being able to show them the advantages and benefits of choosing Nebraska soybeans is highly valuable. Even showing a video of what Nebraska soybean farmers do on their farms is incredibly valuable and beneficial for consumers."

Deepening existing relationships and fostering new ones are key priorities. The NSB continues to pursue markets where soybeans are used for feed, but it also leverages partnerships with animal agriculture partners. Where beef, poultry and aquaculture industries thrive, U.S. soy is sure to follow. That's why the NSB

contributes funds to mutually beneficial projects with groups like the United States Meat Export Federation and United States of America Poultry and Egg Export Council to find inroads abroad.

Reliable trade relationships, built on trust, continue to be nurtured as well. In North America, both Canada and Mexico are top importers of U.S. soybeans. Overseas, the European Union and United Kingdom are steady customers. Asia remains the final destination for most U.S. soybeans, with China accounting for the greatest individual share so far this year. Indications are pointing to Indonesia as a strong new market, but it's India that shows tremendous promise.




"By 2022, India will replace China as the most populous nation. In fact, India is already home to the world's largest middle class," Dorn said. "This rapidly growing sector has the desire and purchasing power to become the largest animal protein market ever—protein like Nebraska and U.S. soy-fed chicken."

Through the United States Soybean Export Council, Qualified State Soybean Boards and Nebraska Department of Agriculture, the NSB can find contacts and footholds around the globe. From there, the NSB puts its dollars toward strengthening export activities.




"Our board works with contractors and organizations that focus on activities in each link of the value chain, from efficiently transporting soy to improving meat marketing and quality protein," Dorn said. "We're also working to promote sustainably grown, high-quality soy for foreign customers. Overall, checkoff dollars used in international marketing are working to ensure success for farmers."

## U.S. Soy's Current Top International Customers




### WHOLE SOYBEANS

1. China 
2. European Union-27 
3. Mexico 

### SOYBEAN MEAL

1. The Philippines 
2. Mexico 
3. Colombia 

### SOYBEAN OIL

1. South Korea 
2. Colombia 
3. Dominican Republic 



China has accounted for **35%** of U.S. soybean exports so far in 2020.

Data source: USDA FAS Export Sales

COVID-19 has provided some challenges with our international marketing activities and investments, but adapting has been key. Maintaining and evolving our partnerships and interactions with virtual opportunities has helped continue to build value for Nebraska soybeans.

— NATHAN DORN, NSB INTERNATIONAL MARKETING COMMITTEE CHAIR



# BEHIND THE CRUSH

A behind-the-scenes look in a soybean processing plant

## CLEANING

Soybeans run through screeners to remove foreign materials, hulls and weed seeds.

## DRYING

(Two methods)

**Traditional:** Storing soybeans to dry down to 11% moisture to pop the hull.

**Hot Dehulling:** Flash drying with heat to pop the hulls quicker.

## EXTRACTING

Solvent is run over the flakes to extract the oil.

## Desolventizer-Toaster-Dryer-Cooler (DTDC)

The flakes are put into DTDC kettles for the next four steps.

**Desolventizing:** Steam distills and recaptures the solvent for reuse.

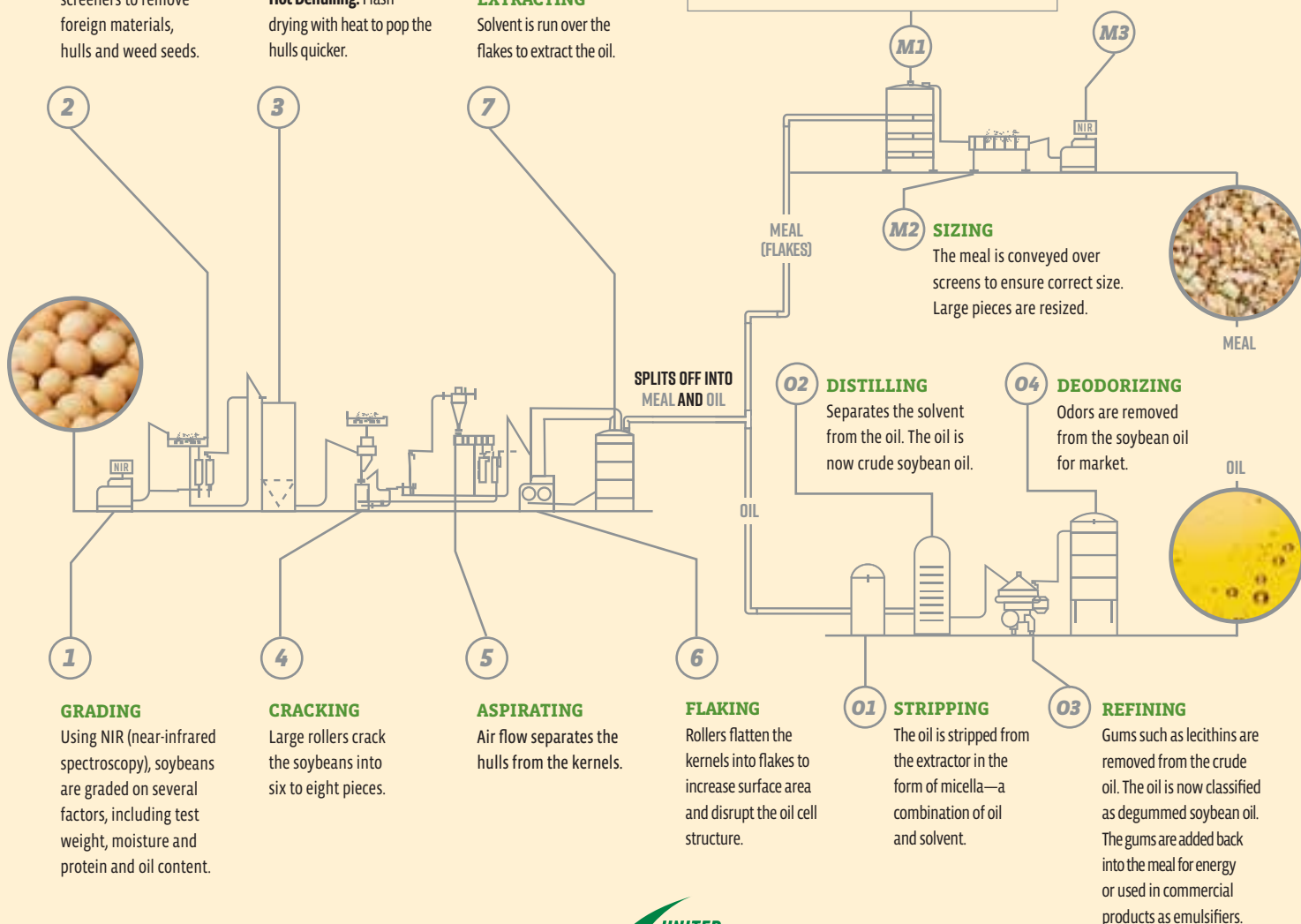
**Toasting:** Removes antinutritional factors, making the protein easier to digest for animals.

**Drying:** Optimizes the moisture of the meal flakes.

**Cooling:** Gets meal flakes close to ambient temperatures.

## EVALUATION

An NIR tests the final product for levels of fiber, residual fat, etc. The product is adjusted if ideal levels are not met.



Information provided by United Soybean Board.

## DID YOU KNOW?

SOYBEANS ARE PROCESSED INTO MEAL AND OIL. BUT HOW THAT HAPPENS IS OFTEN A MYSTERY. HERE'S A BEHIND-THE-CURTAIN LOOK AT HOW A PROCESSING PLANT OPERATES.

# SUPPLY CHAIN OF COMMUNICATION

**Partnership helps connect Nebraska soybean farmers to export customers through weekly international briefings and planned virtual harvest tour.**

In March this year, the Nebraska Soybean Board (NSB) began participation in a program designed to keep its staff and soybean producers in international markets. Nebraska soybean producers and soybean and meal customers from Southeast Asia, China, Thailand, Mexico and Latin America needed to keep both communication and commodity flowing through the supply chain despite the severe bans and lockdowns necessary to combat COVID-19.

The NSB teamed with Mishek Inc. staff, foreign buyers and farms throughout Nebraska, Iowa, Kansas, Minnesota, North Dakota and South Dakota to hold weekly international briefings to educate export customers about Nebraska soybean and corn crop progress, weather and prices.

Typically, the NSB or a partner soybean board will host the session and invite a buyer or trader from an overseas customer. After a review of crop progress and reports from the producers in Nebraska and the other states, the overseas customer gives an update on the current economy of his or her country, food production and supply challenges and trade prospects for the upcoming months. These face-to-face sessions, facilitated through Zoom, have allowed the customer to directly ask farmers their thoughts on the crop and vice versa so both can assess the marketing challenges and opportunities ahead. Usually, 5-6 farmer-leaders and NSB staff provide a view of each geographical sector of the state, as well irrigated and non-irrigated areas.

At the summer briefing, the NSB hosted customers from the Philippines. Terrance Uygongco, chief operations officer of La Filipina Uygongco Corporation, briefed all the weekly participants on the situation in his country with the lockdown restrictions, how the livestock and feed industry are faring and the outlook for import demand. Moving along the supply chain, AGP's Chris Schaffer, vice president of international marketing, and a freight supplier briefed us on the current sales and bulk freight activity in the Southeast Asian soybean meal market and the challenges of continuing to serve customers.

Representatives from Mexico and Colombia also attended some of the weekly briefings. Mexico is currently the second-largest importer of U.S. soybean meal and the third-largest buyer of whole soybeans from the region. The country produces nearly 34 million metric tons of commercial feed for a growing livestock sector. After traveling to Nebraska in recent years, Mexican facility and purchasing managers have come away impressed with the high-quality crops and modern shipping facilities the state's cooperatives have built over the last decade and continue to invest in today.



Each year, before and during harvest, NSB staff and board members work to educate international buyers about Nebraska's soybean quality, supply dependability and superior logistical advantages. Due to the pandemic, this year's harvest tour has been planned as a virtual tour with an established, ready base of interested participants from this summer's briefings. The virtual harvest tour will be online and available in English, Mandarin Chinese and Spanish so all markets can enjoy and learn during Nebraska's 2020 harvest. In addition to the virtual tour, the NSB is working with the University of Minnesota and United Soybean Board to collect samples from Nebraska farmers and facilities to measure crude protein, oil and amino acid levels in Nebraska soybeans, demonstrating the advantage of U.S. soy.

## International Briefing Objectives

- ▶ Continued communication with international markets.
- ▶ Conversation on trade issues.
- ▶ Discussion of planting and growing conditions.
- ▶ Progress in local agriculture for producers and international customers.

# PIVOTING DURING THE PANDEMIC

**U.S. Soybean Export Council transitions to digital conferences that provide valuable global and U.S. market insights to customers and soybean industry representatives.**

*By U.S. Soybean Export Council Staff*

**D**espite the COVID-19 pandemic, the U.S. Soybean Export Council (USSEC) has worked to maintain close contact with key customers around the world. The organization nimbly transitioned to leverage digital and technology platforms, and between April and August, hosted 80 virtual events with more than 25,000 participants, engaging key importers of U.S. Soy. These events demonstrate the core pillars representing the U.S. Soy Advantage—exceptional composition, consistent supply, sustainability and innovation beyond the bushel—while highlighting how the soy industry has remained reliable and sustainable since the onset of the pandemic.

While COVID-19 has substantially impacted markets worldwide, U.S. soybean farmers are meeting market needs through innovative tactics despite the challenges. Reaching key soy importers at each event, U.S. farmers and globally recognized experts discussed world agricultural trends, the 2021 U.S. soybean crop outlook, soybean demand fluctuations, U.S. Soy's deep commitment to sustainable production and more during each of these meetings. Participants also heard about the initiatives and long-term investments U.S. Soy has undertaken to ensure that they have access to the

most consistent supply of high-quality soybeans on the market.

"During the early stages of COVID-19, USSEC pivoted to engage customers virtually in new ways and maintain these thriving relationships to reiterate our unwavering dependability and adaptability as a proud supplier of choice," said Jim Sutter, USSEC CEO. "And we continue to innovate to reach customers and stakeholders around the world. Many customers have expressed an appreciation for the opportunity to hear from experts in the field and network with U.S. and soy stakeholder organizations virtually that have a vested interest in utilizing soy in their products."

Additionally, the events provided key decision-makers and industry participants the opportunity to attend virtual trade shows with U.S. exporters and interact with other conference attendees in real-time. This unique digital convening provided a similar experience to meeting in person, but technology offered the flexibility to watch the sessions (at any time), visit organizations in a virtual exhibit hall or interact one-on-one with other industry professionals, with the benefit of embedded translation to break down language barriers.

U.S. soybean farmers also had a prominent presence at these digital

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Aside from the product itself, our importers have appreciated the professionalism and educational sessions that U.S. Soy offers.

Looking ahead, we must cultivate our partnerships in this region even further.

— MONTE PETERSON, USSEC CHAIRMAN

”

conferences and virtual meetings, sharing their perspective of the 2020 planting season and discussing the sustainability practices that they've implemented on their farm.

"While the growing season is keeping us busy, these interactions are table stakes for our farmer leaders. We always hear from our customers that they like the total package provided by U.S. Soy, spanning the quality, consistency, reliability and the logistics superiority of our transportation infrastructure delivering the product," said Monte Peterson, Chairman of USSEC, board member of the American Soybean Association and soybean farmer in Valley City, North Dakota.



To learn more about how USSEC works to build preference and demand for U.S. soybeans and soybean products, visit [ussec.org](https://ussec.org) and [ussoy.org](https://ussoy.org) for the latest industry news and updates.





# HELPING SET THE ‘WORLD’S TABLE’

Partnering with USMEF is helping expand U.S. pork's footprint in markets worldwide.



The U.S. Meat Export Federation (USMEF) has worked toward growing export markets for U.S. red meat products for 44 years. Since it began operations in 1976, USMEF has created opportunities and developed markets in more than 100 countries. The Nebraska Soybean Board (NSB) has been a partner in several key markets for U.S. pork. More specifically, the NSB has supported activities in Japan and Mexico, two of the top destinations for U.S. pork exports. To date, U.S. pork exports account for 31.5% up from 25.8% in 2019. In 2019, Japan and Mexico accounted for 40% of U.S. pork exports.

With the investment of Nebraska Soybean Checkoff funding, USMEF intensified its campaign to leverage U.S. pork's strengths relative to its competitors in the market. Key points of differentiation include superior water-holding capacity; moisture of product; minimal cooking loss; and benefits of U.S. soybean meal feeding in U.S. pork rations.

USMEF's promotion of these advantages under its "Three Star American" (Mitsuboshi) umbrella image along with the ongoing Gochipo image campaign has helped stem the tide.

In Japan, the USMEF team has been able to advance U.S. pork's distinction versus pork from other countries and improve its position as a strong choice for better taste and health.

"The U.S. Meat Export Federation values our partnership with Nebraska agriculture and specifically Nebraska's soybean industry," said John Hinners, USMEF vice president of industry relations. "Soybean farmers in Nebraska have a long history of supporting value-added red meat exports. The soybean checkoff investment helps USMEF expand its reach in international markets and provide U.S. soy-fed red meat to consumers around the world."

Gerardo Rodriguez, USMEF regional marketing director for Mexico, Central America and the Dominican Republic, said work to promote U.S. pork in Mexico requires innovation and a forward-looking approach. Funding from the Nebraska soybean industry is vital to USMEF's efforts.

“

Working together to export Nebraska soybeans through value-added U.S. beef, pork and lamb demonstrates how we can align under our mission of 'Putting U.S. Meat on the World's Table.'

— JOHN HINNERS, USMEF VICE PRESIDENT OF INDUSTRY RELATIONS

”

"With our programs, we are developing new products and new dishes that expand the use and value of U.S. pork in the region," Rodriguez said. "A big part of it is education—keeping consumers in Mexico informed. We have brand ambassadors—chefs, bakers and bartenders—who have been trained on how to share information about the value and quality of U.S. pork and they are promoting U.S. pork through their social media followers and at their businesses."





# EXPORTING NEBRASKA SOYBEANS THROUGH U.S. PORK



The market value of pork exports to Nebraska soybeans in 2019



*(soybeans consumed by pork exports × annual avg soybean price)*

2020-2029  
**FORECAST GROWTH IN EXPORTS**



Soybean meal through pork exports



Direct soybean exports



Direct soybean meal exports

## \$911 MILLION

The projected market value of pork exports to Nebraska soybeans from 2020-2029

In 2019 pork exports added 9% of bushel value



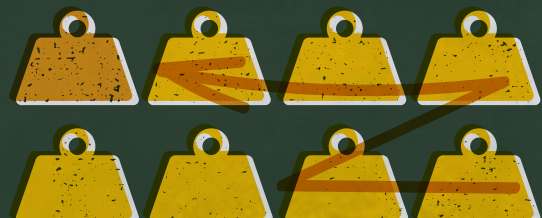
Without pork exports, Nebraska soybean farmers would have

**LOST \$215 MILLION IN SOYBEAN REVENUE IN 2019**

*(state soybean production × \$0.76/bushel)*



**1 IN EVERY 8 TONS** of added feed demand for U.S. soybean meal was from pork exports





# EDUCATING NEAR AND FAR

During COVID-19, the NSB has contributed to USAPEEC educational activities in both hemispheres.



**C** OVID-19 has left no surface untouched, including the USA Poultry and Egg Export Council's (USAPEEC) international programming. The worldwide limitations on in-person events have certainly challenged USAPEEC's international marketing teams to get even more creative in ways to conduct their activities. In the case of projects sponsored by the Nebraska Soybean Board (NSB), this "pivot" has resulted in positive opportunity for broad-reaching international education on U.S. poultry and eggs.



## U.S. Poultry and Egg Exports: By the Numbers

**145  
MILLION**

Continued communication with Approximately **145 million soybean bushel equivalents** (11.5 million soybean bushels from Nebraska) were exported through U.S. chicken, turkey, duck and eggs worth **\$4.5 billion** in 2019.

**1.5  
MILLION**

USDA projects U.S. poultry and egg exports will rise **1%** in 2020, and USAPEEC estimates that will result in **1.5 million more soybean bushels** being used in the U.S. (about 119,000 more soybean bushels from Nebraska).

## INDIA

With an aim to educate young chefs in the food service industry, the NSB-sponsored U.S. Poultry Master Classes—originally set to be held in-person but instead moved online—engaged three top Master Chefs of India. This early transition to a virtual format helped our India team achieve overwhelming participation from across the country.

Highlighting quality and versatility, the classes explained how to integrate U.S. duck and turkey into the varied traditional and modern Indian cuisines. The classes reached over 3,500 cumulative participants PAN India and received tremendous support from the leading Indian culinary institutes (with some even incorporating these master classes into their curriculum).



Chef Varun Inamdar "found the master class a very unique way of engaging with participants from across India from their home under a nationwide lockdown; the response and acceptance has been amazing." Indian Television Celebrity Chef Harpal Singh Sokhi opined that now "he intends to introduce U.S. duck and turkey in a bigger way in his own restaurants in Ludhiana, Amritsar and Bengaluru." MasterChef India Judge Chef Ajay Chopra noted that "this virtual masterclass has provided a great opportunity to integrate U.S. turkey and duck to the local regional cuisine in India."

The emerging Indian market holds a potential for 305,000 metric tons of U.S. poultry exports or an equivalent of 11.2 million soybean bushels. However, current tariff rates imposed on U.S. chicken meat are limiting the flow of U.S. exports to India. Ongoing trade negotiations could reduce this restriction which would greatly increase exports.

## MEXICO

Under NSB funding, USAPEEC's Mexico office has participated in an annual educational seminar program conducted at Mexican points of entry with border inspectors and officials from various branches of the Mexican government. Organized as a joint effort with the Mexican Meat Processors Council (COMECARNE), this program is especially important due to the high turnover rate of Mexican border officials and because import regulations change frequently.



Because of the COVID-19 pandemic, the 2020 program schedule was temporarily placed on hold. In lieu of these events, USAPEEC Mexico sought support from NSB to assist in funding their electronic Imports/Exports Handbook.

USAPEEC Mexico has worked to develop this interactive online tool to advise U.S. poultry and egg producers and Mexican importers and processors on the export/import process into Mexico in order to be in compliance with the Mexican authorities at all points of entry. Reviewed by the USDA's Food Safety and Inspection Service and industry leaders, it will be available in both English and Spanish. USAPEEC is also seeking endorsements of this tool by the Mexican Confederation of Customs Brokers (CAAAREM) and the Mexican Animal Health and Food Safety Agency (SENASICA). Most importantly, the new online format will allow for a broader audience reach.

Mexico has been the largest market for U.S. poultry since 2010 valued at \$1.1 billion in 2019, which represents an equivalent of more than 34 million soybean bushel equivalents or 2.8 million soybean bushels from Nebraska. U.S. poultry exports to the Mexican market are expected to reach about 890,000 metric tons in 2020.

*Statistics are determined from USDA data.*




[unitedsoybean.org](http://unitedsoybean.org)

# MAINTAINING OUR REPUTATION TO DELIVER

*Whether shipping by river, road or rail, the soy checkoff is committed to ensuring America's infrastructure is a significant advantage for U.S. soybean farmers. We're looking inside the bean, beyond the bushel and around the world to keep preference for U.S. soy strong. And it's helping make a valuable impact for soybean farmers like you.*

*See more ways the soy checkoff is maximizing profit opportunities for soybean farmers at [unitedsoybean.org](http://unitedsoybean.org)*



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*Nebraska Soybean Farmers*

# FUELING NEW MARKET SECTOR



Answering  
your questions about:

**BIODIESEL**  
**RENEWABLE DIESEL**  
**RENEWABLE JET FUEL**





**T**he renewable fuel industry is ever-expanding and changing. No one knows that more than soybean producers. As the Nebraska Soybean Board partners with the National Biodiesel Board and other organizations within the industry, they are looking for new markets and technologies that tap into soybean oil and provide value-added services to the state's feedstock producers. Renewable diesel and sustainable aviation fuel are some of those opportunities making a growing impression across the state and nationwide.

"People often assume renewable diesel is just another term for biodiesel, but it's not," says Scott Fenwick, technical director for the NBB. "Think of renewable diesel like biodiesel's cousin. They share similarities like both being made from a variety of fats and oils, including soybean oil, opening yet another market for soybean farmers."

Fenwick adds both renewable diesel and biodiesel meet ASTM fuel specifications, and both are considered Advanced Biofuels. But, they also have some distinct differences, such as their production process.

Producers generate biodiesel through transesterification, creating the by-product glycerin; whereas renewable diesel's path looks more similar to petroleum diesel: hydrotreating the oil. The by-product of hydrotreating is

then natural gas, which can be used to fuel the process itself. Renewable diesel producers follow hydrotreating with an additional process called isomerization.

The combination of hydrotreating and isomerization result in a fuel—renewable diesel—that can be used up to 100% in existing diesel engines with no modifications. With significantly higher cetane values than petroleum diesel that lead to enhanced combustion as well as potentially better cold flow properties, renewable diesel opens the door for expanding renewable fuel markets.

"Renewable diesel can be processed further into sustainable jet fuel, a relatively untapped market as far as renewable fuels have been concerned. That is just beginning," says Fenwick. "Renewable diesel producers have already begun serving jet fuel customers in California with much success."

Sustainable aviation fuel has already begun playing a role in reducing carbon emissions within the aviation industry.

"Will renewable diesel replace biodiesel? No," adds Fenwick. "While renewable diesel has a role to play in the market, it currently only makes up about a third of overall demand for petroleum diesel replacements because there are trade-offs when it comes to producing renewable diesel, price being one of the biggest."

Fenwick explains that while biodiesel and renewable diesel are made from the same feedstocks, the processing is what makes renewable diesel more expensive.

"Biodiesel, renewable diesel and sustainable jet fuel are huge benefits to rural Nebraska," says Tony Johanson, a soybean farmer from Oakland. "This industry continues to prove that it is a strong market for soybean farmers today."

The benefits of each fuel are complementary, leading to blends of renewable diesel and biodiesel being used throughout the country and helping fleets meet their sustainability goals with a 100% renewable fuel.

"This inclusive market opens up new opportunities for soybean farmers," says Greg Anderson, a soybean farmer from Newman Grove. "It is exciting to see the biodiesel and renewable diesel industry grow together. Growth for renewable diesel means growth for biodiesel and our industry. Moving forward, biodiesel, renewable diesel and sustainable aviation fuel are partners in building a better, cleaner future."

The biodiesel and renewable diesel industry has a goal to reach six billion gallons by 2030. Soybean farmers and biodiesel producers will continue working together to fuel that market growth.

# FOOD, FARMING *and the* CONSUMER

The consumer engagement director for The Center for Food Integrity sheds light on how evolving purchasing habits impacts farming.

**R**oxi Beck doubles as the consumer engagement director for The Center for Food Integrity (CFI) and a vice president with Look East Consulting, an agricultural public relations and strategic communications firm.

In both roles, she looks deeply into consumer behaviors—especially the ones that impact the ag industry.

In a recent Q&A, she shared why farmers should be keeping an eye on buying trends and how they've changed during COVID-19.

**NEBRASKA SOYBEAN BOARD (NSB):** How have consumer behaviors with food shopping and purchases shifted over the last decade? What are the driving forces behind those changes?

**ROXI BECK (RB):** Cracking the code on consumers' purchasing intent compared to their actual purchasing behavior is a question I've received my whole career. There are countless shifts that take place on an annual basis, including changes in product variety, price, convenience and information.

The biggest shift I've seen over the past decade is consumers' access to information through digital channels. This information has both empowered and burdened consumers: Never before have they wanted to know more about food, yet understood less about the system from which it comes. Never before have they had access to as much information from multiple channels and sources about food and the food system, yet lack direct access to people who make it possible. Consumers are mostly disconnected from the production of food they eat, yet completely reliant upon it. It's a challenge, but it offers unprecedented opportunity.

**NSB:** How have consumer behaviors changed during COVID-19?

**RB:** There are multiple trends we've seen in home cooking. Some link to better health, some hone in on comfort, and every one of them means consumers are getting more involved with their food. Consumers are:

- **Exploring the culinary world from home** because they link ethnic cuisines to healthy ingredients like steamed veggies and sweet potatoes. They cook ethnic foods to have fun and learn about the world while improving their diet. Specifically, they're incorporating more Middle Eastern, Indian and Asian dishes.
- **Looking for more lean proteins**—chicken, fish and legumes in particular—to reduce added fats.
- **Preparing more “veggie-forward” dishes** since plant-based diets are linked to better long-term health. What's interesting is that they're choosing broccoli, sweet potatoes, brussels sprouts, asparagus and carrots more frequently. These are the veggies I grew up with—not the new “superfood” veggies we're used to seeing as trendy—and they're getting



Roxi Beck

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While our days shift to looking more like they used to, I suspect a majority of families will keep some of these new preferences in the mix for the long haul.

— ROXI BECK, CFI CONSUMER ENGAGEMENT DIRECTOR

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pretty standard treatment in the kitchen: roasting, baking and steaming.

- **Seeing comfort foods as healthier if they're homemade.** It's as though we've found an alibi in flours and fermentation! If you're like me, you may have been on the receiving end of a sourdough “chain mail” letter during the quarantine.
- **Wanting to cook elaborate meals for special occasions.** Just because much of life came to a screeching halt doesn't mean life's celebrations did. We experienced countless requests for birthday parades, card showers and family Zoom calls to make an abnormal time special. And with every great celebration comes great food. While we may have scaled back on the quantity of food, quality wasn't sacrificed. Consumers still crave high-fat, decadent, restaurant-style meals, and they cook them at home for special occasions. These include steak, ribs and other high-end cuts of meat.
- **Preferring recipes that highlight few, high-quality ingredients.** Even with extra time to cook, most consumers don't want fussy meals or a long list of ingredients to buy from stores where our new shopping experience includes one-way aisles, masks and routine sanitizing of surfaces. CFI research shows that “chemicals in foods,” artificial ingredients, too many ingredients or even ingredients that are hard to pronounce are topics of personal concern for nearly 50% of all consumers. So this concern has new utility in a desire for simple meal prep.

- **Wanting to make convenience foods healthier.** For many, though life is less on-the-go than it was prior to March, consumers are still looking to convenience foods—like frozen dinners and box mixes—to ease meal prep. This means consumers are adding veggies or lean protein to ramp up the nutrition quotient and their role in bringing a delicious and healthy meal to their families.

**NSB:** Do you think any of those shifts will continue beyond the pandemic?

**RB:** We're not out of the woods with COVID-19, and depending on how seamlessly (or not) we move through the back-to-school, fall sports and flu seasons, much is yet to be determined. In anecdotal conversations with consumers of many types, there's been a new appreciation for having time at home to plan, prepare and enjoy home cooking. While our days shift to looking more like they used to, I suspect a majority of families will keep some of these new preferences in the mix for the long haul.

**NSB:** How do consumer behaviors affect farmers' operations?

**RB:** Consumers have and ask many questions of branded food companies, restaurants and the grocery stores at which they shop. This increases their pressure, so they turn to agriculture through associations, organizations and influencers for engagement and even change. This is part of the work the CFI facilitates for our members—to ensure food system decision-makers understand more about why the segments operate in the way they do and convey the tradeoff implications for decisions they're considering.

**NSB:** What advice do you have for farmers trying to respond to and get ahead of these challenges?

**RB:** The best thing farmers can do is truly listen to what consumers are saying—not so that we can identify where they need education, not to simply correct their information, and certainly not to persuade them out of their deep-seated fears or positions.

Truly listening will help you understand what is driving their concerns. When you listen with the intent to understand (versus with the intent to refute their claims), you start to hear why their ideas and concerns are valid. I'm not advocating for you to agree with every consumer demand or idea—I'm simply asking for those of us involved in food production to be willing to be educated about consumer perceptions in a way that's consistent with the way we wish consumers were educated about food production. When that happens, I think it will be bliss.



## Potential for Change

The pandemic has changed consumer behaviors this year. If and when COVID-19 winds down, Roxi suggests monitoring for increases and decreases in key areas.

### INCREASES

- ↑ Online grocery shopping
- ↑ Consumption of plant-based foods
- ↑ Scrutiny for food production, processing and packaging

### DECREASES

- ↓ Dining out
- ↓ Ability for processing plants to stay online
- ↓ Number of SKUs/variety of food products



Full consumer research is available to CFI members, but summaries are available at [FoodIntegrity.org/research](https://FoodIntegrity.org/research).





V-Series Grain Carts



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# BATTLING BILLION-DOLLAR YIELD ROBBERS? DON'T WORRY. WE'RE ON IT.

Sudden death syndrome, stink bugs, soybean cyst nematodes and many other yield-robbing pests and diseases. It's a rough world out there, costing soybean farmers billions of dollars every year. Fortunately, your state soybean checkoff is on the job with research projects to develop effective traits and practices to get back as much of your yield as possible. Visit [soybeanresearchinfo.com](http://soybeanresearchinfo.com) to learn more.



SOYBEAN RESEARCH &  
INFORMATION  
NETWORK



ADDITIONAL FUNDING PROVIDED WITH SOYBEAN CHECKOFF DOLLARS THROUGH THE UNITED SOYBEAN BOARD AND NORTH CENTRAL SOYBEAN RESEARCH PROGRAM

# THINKING BIG: IMPROVING SOYBEAN GERMPLASM FOR AQUACULTURE

By Carol Brown, USB database communications

**S**cientists in Nebraska are developing enhanced quality soybean germplasm for targeted end-use as a sustainable feedstock for the aquaculture industry. But these researchers are looking well beyond the microscopic views they examine daily.

Ed Cahoon, director of the Center for Plant Science Innovation at the University of Nebraska–Lincoln (UNL), and Tom Clemente, professor in the UNL Department of Agronomy and Horticulture, are co-investigators on the project. Their research team has achieved success in developing a soybean with new traits that target nutritional quality for fish feed.

“Wild fish are doing well, but to meet consumer demand, we’ll need to start growing more farm-raised fish,” Clemente said. “We’re looking at using

soybeans to feed fish just like feeding hogs and chickens.”

They are developing soybeans that contain both high-quality protein and long chain omega-3 fatty acids through a project supported by the Nebraska Soybean Board.

“The two key ingredients fish need are fish meal and fish oil. Little fish, like anchovies and sardines, are needed to feed big fish,” Clemente said. “We can do this instead from a terrestrial feed source without having to harvest the little fish, where the industry is currently extracting the fish oil and fish meal.”

Cahoon explained that soybeans don’t naturally contain EPA and DHA fatty acids, the major components in fish oil that provide the nutrition fish need and humans desire in their diets.

“Producing this isn’t something we can do with conventional breeding or gene editing,” Cahoon said. “We have to get the genes to mix with complex pathways from other sources like algae.”

The two have been successful in doing so and have displaced 50 percent of the fish oil with high omega-3 soybean oil. The team is confident they can develop a formulation that would be 100 percent land-based to feed salmon and other fish, with no marine ingredients required, Clemente said.

The team also was successful in adding astaxanthin, a highly valued carotenoid that gives the pink color to salmon and shrimp; and accomplished it at a fraction of its current cost.

“We’ve gotten past the proof of practice, now we’ve moved to aspects of production,” Cahoon said.



Tom Clemente

Ed Cahoon

## Better soybeans lead to bigger issues

The achievements that Cahoon and Clemente have experienced have been met with roadblocks in the scaling-up sequence.

“The U.S. doesn’t permit off-shore aquaculture facilities,” Clemente commented. “There’s only one permitted in the United States right now. We can drill for oil in the Gulf of Mexico, but we can’t grow fish because it’s viewed as a potential pollutant.”

To complicate matters, there’s no place to keep these specialty soybeans separate from the traditional crop.

“We’ll need elevators that are geared to handle these high-value products. Currently, we don’t have the ability to identity-preserve these items in a cost-effective fashion,” Clemente said. “In the future we’re going to need a commodity stream and an identity-preserve stream.”

Cahoon and Clemente envision a new system that will lead to job creation for rural America as well as increased income for farmers.

“Elevators could be designed for the identity-preserved items,” Clemente said. “You could fractionate the omega-3 oil; fractionate the astaxanthin, which has other uses beyond agriculture, and still have the high-value protein that can be sold.”

For two scientists working to develop a higher-quality soybean, clearing roadblocks is not where their expertise lies, but they are optimistic it can be accomplished.

“The commodity system has focused on yield, but it needs to become about quality and higher value of soybeans for farmers,” Cahoon said.

Clemente predicts farmers and others will come around to their way of thinking.

“In the future, the vast majority will be commodity soybeans—the high oleic bean,” Clemente said. “But we’re going to have 25 to 30 percent of the market to go to these specialty items that need an identity-preservation track.”

With a burgeoning aquaculture industry and specially developed soybeans ready to feed the fish, these researchers are hopeful the future is as rosy as a healthy pink salmon.



Photo credit: United Soybean Board



# COMES FULLY LOADED.

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