Foundation highlights K-State’s charcoal rot research

Kansas State University (K-State) researchers have received national recognition for a study that shows how planting a mustard cover crop can help improve soil health and, ultimately, boost soybean yields.

The Supporters of Agricultural Research (SoAR) Foundation, a coalition that advocates for federal investment in agriculture, has recognized their work, which the Kansas Soybean Commission funded.

SoAR featured the K-State study in the report, *Retaking the Field: Science Breakthroughs for Thriving Farms and a Healthier Nation*, published March 27. It highlighted several pioneering research projects in the United States.

“Our research team looked at how we can manage soil health to improve its productive capacity,” said Gretchen Sassenrath, a research agronomist at the Southeast Research and Extension Center in Parsons.

Farmers in southeastern Kansas know well that the soil in their region contains an abnormally high amount of charcoal rot, a fungus that chokes the plant’s recycling system so it cannot get nutrients or water, ultimately killing its roots.

“Charcoal rot tends to be worse in hot, dry conditions, and that’s what happens in Kansas in the summer,” Sassenrath said. “We get hot and dry, and the charcoal rot grows and infects our soybean plants.”

There are chemical treatments for charcoal rot, but Sassenrath and colleagues Chris Little, Xiaomao Lin and Kraig Roozeboom were interested in finding natural agents to counter the effects of the fungus.

It led them to a mustard-seed cover crop, the same plant used to make the popular condiment.

The plant, Sassenrath said, “has a high glucosinolite concentration. Glucosinolate is the ‘tang’ that we like in mustard, but in soil, the glucosinolate produced in the mustard plant acts as a biocontrol of the charcoal rot fungus.”

Over two growing seasons, the K-State researchers showed that planting mustard seed as a cover crop reduces the incidence of charcoal rot in the soil.

“Mustard seed has actually been shown in other systems to improve the overall soil health,” Sassenrath said. “The approach I am taking is more of a holistic approach. For example, if a person is healthy, they might come into contact with people with a cold, but they won’t get sick themselves because they are overall healthy.

“In the same way, if we can support the soil in a positive way with positive microbes and things that they need, it improves the overall soil health, and the soil will be better able to manage diseases that are naturally there all the time.”

The researchers also tested various management options, including planting soybeans into standing mustard seed, mowing it or tilling it to incorporate residue into the field. Their key finding: Leave the mustard crop as intact as possible.

“We just rolled the mustard cover crop over the top of the soil and planted straight into that, that was the best in terms of reducing the charcoal rot,” Sassenrath said.

Charcoal rot is one of the most consistent causes of soybean yield loss in Kansas each year, noted Marty Draper, interim associate dean for research and graduate programs.

“The research being done by our K-State team is innovative in its approach to learning the specific stressors in the Kansas environment that make it such a persistent problem,” he said.

The group is continuing its work, including looking at effects on yields due to sudden death syndrome and soybean nematodes.

“It’s been suggested that the mustard can control those or have some impact on preserving yield when those are present, but we don’t know for sure,” Sassenrath said. “Again, it’s a holistic approach to soil health and getting more bushels per acre. There is a lot of promise with this mustard seed as being a mechanism or a tool that can be used to improve the overall soil health.”

The work exemplifies how research and applied science can meet challenges and solve problems in a way that makes agriculture more sustainable, stated Ernie Minton, interim dean of K-State’s College of Agriculture.

“Wisely and intelligently harnessing nature’s power by, in this case, using cover crops extends the reach of each research dollar that is invested,” he said. “The return on that investment will be a healthier Kansas, healthier planet and healthier people.”

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Gretchen Sassenrath’s research integrates her understanding of crop production and how nature works to build a better environment. [K-State photo]

Graduate student Haidong Zhao (left) and plant pathologist Chris Little study soil health to combat diseases that reduce crop yield and quality. [K-State photo]

KSoybean for Kansas soybean farmers
News from the Kansas Soybean Commission – the soybean checkoff | Summer 2019

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K-State: 2,4-D resistance in Palmer amaranth confirmed

A Kansas State University researcher is reporting the first-ever study confirming that Palmer amaranth has developed resistance to the herbicide 2,4-D. Those findings may signal an important step in developing future controls for the pesky weed.

Vipan Kumar, a weed scientist at the Agricultural Research Center in Hays, said a few farmers had reported poor control with 2,4-D since 2015. Until now, however, researchers were not able to confirm the resistance levels to 2,4-D in Palmer amaranth.

“Historically, Palmer amaranth was not a problem weed in western to central parts of Kansas, but over the past 10 to 15 years, it has become a major problem, and it is present in all crop situations and even in non-cropland situations,” Kumar said.

Palmer amaranth is extremely aggressive and considered the No. 1 weed problem in U.S. agriculture. It commonly is found in Kansas cropping systems and negatively affects soybean, corn, sorghum, sunflower, cotton, wheat and fallow fields. It also is a serious problem in wheat stubble.

Kumar and his research team recently have tested one biotype of Palmer amaranth. The results, he said, are sobering.

That biotype has been confirmed with low levels of resistance not only to 2,4-D but also to glyphosate, chlor-sulfuron, atrazine and mesotrione.

In addition, Kumar said the biotype showed less sensitivity to fomesafen, a herbicide commonly used in soybeans. He added that more research is underway to confirm that biotype has developed resistance to fomesafen.

“This discovery confirms the first case of 2,4-D-resistant Palmer amaranth biotype that has also developed multiple resistance to four other herbicide modes of action,” Kumar said. “We have been seeing a lot more populations with multiple resistance, especially with glyphosate, atrazine and HPPD inhibitors. There is increasing concern about Palmer amaranth’s ability to resist multiple modes of action.”

Kumar’s findings have been published in the journal Pest Management Science. The article, “Confirmation of 2,4-D Resistance and Identification of Multiple Resistance in a Kansas Palmer Amaranth Population,” is available at http://j.mp/resistant-palmer on the web.

Research shows good results for both fish, soybean farmers

The Soy Aquaculture Alliance (SAA) works to create new opportunities for soybean farmers within a growing domestic market: aquaculture. SAA funds programs and research that increase the use of U.S. soybeans in fish and shrimp diets through affiliations with academic and private researchers and industry leaders.

Results from SAA-funded research were released recently. The 2018 study with the South Carolina Department of Natural Resources on using metabolites as a biological marker for nutritional stress in red drum opens the door to understand better how soybean-formulated diets affect fish growth and feed conversion.

Results found fish fed a 60% supplemented soybean-meal diet had nearly the same growth, weight and feed conversion of fish fed squid, shrimp and fish diets.

The research provides a path for assessing that biological marker and allowing nutritionists to develop feed alternatives within acceptable limits for various fish species without causing nutritional stress. Ultimately, the marker could lead to further research for higher and better soybean-meal inclusion rates to benefit both the U.S. aquaculture industry and U.S. soybean farmers.

“All study we do gives us more basis for believing soybeans are a real opportunity for the U.S. aquaculture industry,” said John Wray, Ottawa, who chairs SAA. “We’ve been investing for a number of years, and every study builds on the previous one. We’re making real headway and showing results that will benefit both fish and soybean farmers.”

A volunteer board representing U.S. soybean farmers and industry members governs SAA. Membership is open to state soybean boards, as well as public and private entities in the soy, aquaculture and seafood industries.

The Kansas Soybean Commission is a Class A member and invests about $25,000 per year in SAA. Learn more at http://SoyAquacAlliance.com on the web.
Commissioners seated for eastern districts

Results of this year’s elections for the state’s five commodity commissions in districts 7, 8 and 9 in the east have been announced by the Kansas Department of Agriculture. Those commissioners began three-year terms April 1.

Gary Robbins is the new soybean commissioner for District 7. A fourth-generation farmer from Emmett, he farms in Pottawatomie County. He is a member of several organizations, including the Kansas Soybean Association (KSA), Kansas Corn Growers Association (KCGA) and Kansas Association of Wheat Growers (KAWG). He has participated in the American Soybean Association’s Young Leader and Leadership at Its Best programs.

Robbins succeeds Jim Zwonitzer of Atchison County, who represented the northeastern district since 2004.

Mike Bellar returns as the soybean commissioner for District 9 in the southeast. He grows soybeans, corn, wheat and hogs in Elk County. He is active in several organizations, including KSA, KAWG, KCGA, Kansas Farm Bureau, Kansas Livestock Association and Kansas Pork Association. He also has had leadership roles on his local Farm Credit board of directors and Farm Service Agency county committee. He has a bachelor’s degree in agricultural business from Fort Hays State University.

Lacking a candidate on the ballot, at their March 15 meeting, the commissioners reappointed Bob Haselwood of Shawnee County to represent the east-central county of District 8. He is a soybean and corn farmer, past chairman of both the Kansas Soybean Commission and United Soybean Board, and a member of KSA and KCGA. He has an associate degree from Cowley College and is a graduate of the Kansas Agriculture and Rural Leadership program.

Soybean farmers in central Kansas will elect representatives for districts 4, 5 and 6 next year. Information about the election process is available at http://agriculture.ks.gov/kda-services/kansas-commodity-commissions on the web or by calling 785-564-6700.

State agriculture department celebrates Kansas Ag Day

In honor of Kansas’ largest industry, employer and economic driver, the Kansas Department of Agriculture (KDA) observed March 14 as Kansas Agriculture Day. Additionally, the governor proclaimed March as Kansas Agriculture Month. Throughout it, the department and its industry partners, including the Kansas Soybean Commission, celebrated the hardworking people in agriculture and recognized how Kansas farmers and ranchers feed families around the world.

On Kansas Agriculture Day, industry representatives shared localized agricultural facts with legislators, and the Kansas Dairy Association set up a mobile classroom south of the Statehouse.

Throughout the month, KDA honored the 2019 theme, Food for Life, with the annual Neighbor to Neighbor statewide food drive to reduce hunger in Kansas. It was a collaborative effort with Dillons Food Stores and the state’s three food banks to reach every community.

Learn more about the celebrations at http://agriculture.ks.gov/KsAgMonth on the web, or search social media for the #KSAgDay and #KSAgMonth hashtags.

Tech Toolshed is free resource

On-farm technologies can be as complex as they are essential, but new guidance from the soybean checkoff aims to help farmers maximize their data to make the best management decisions.

The checkoff’s Tech Toolshed, in partnership with five universities, released a new installment of free resources to help farmers incorporate digital and precision-agriculture systems into their farm-management strategies.

The newest release focuses on data literacy and offers insights and tips to help soybean farmers better understand the agricultural data landscape, evolving agricultural technologies, data analytics and other features. The six pillars of data literacy outlined in the Tech Toolshed’s resources are fundaments, integrity, management, sources, uses and legalities.

The United Soybean Board developed the Tech Toolshed as an unbiased information source to help soybean farmers maximize existing technology, integrate new technology and make use of the vast quantity of data available. The five land-grant universities that collaborated on the project were Kansas State University, the University of Nebraska-Lincoln, Iowa State University, Purdue University and Ohio State University.

For more information, visit http://UnitedSoybean.org/TechToolshed on the web, or follow @TechToolshed on Twitter.

Industry partners join KDA staff in celebrating Kansas Agriculture Day at the Statehouse. Communications Director Brad Parker (back row, second from left) represented the Commission. (KDA photo)
Kansas agriculture seeks to build resilient rural communities

In an effort to build resilient rural communities in Kansas, retailers, grape and crop growers, conservationists, beekeepers, teachers, and elected officials gathered for a Growing Good Neighbors pilot-project dinner April 11 at the BlueJacket Crossing winery near Eudora.

The first dinner of its kind in Kansas was designed to bring together a wide array of agriculturalists and key stakeholders over a shared meal to reduce conflict and foster a mutual understanding of each other’s livelihoods.

“Whether it’s determining the location of sensitive crops or pesticide applications, resolving conflict among neighbors is much easier when they’ve met and have a relationship built upon trust,” said Ron Seeber, CEO of the Kansas Agribusiness Retailers Association (KARA).

The dinner aimed to create a relaxed atmosphere conducive to a bigger conversation about what it means to be good neighbors and how quality relationships can help avoid costly and unpleasant situations.

“We are so appreciative of the support given to this effort by the agricultural producers of Kansas,” said Stephanie Regagnon, CEO of FieldWatch, a nonprofit that provides online mapping tools to promote pesticide stewardship. “In the agriculture community, we are quick adopters of innovation and new technologies, yet we still rely on the power of an old-fashioned handshake to build trust.”

In what stakeholders hope is just the first of many productive conversations among producers, participants walked away with a greater understanding of issues affecting communities and helped uncover common values while coming to mutual understandings.

KARA was the main organizer and sponsor. The Kansas Soybean Commission was one of seven other co-sponsors.

“It was encouraging to have so many diverse members of the community gathered to discuss issues important to them,” said Jancey Hall, the Commission’s program manager.

Above: Jancey Hall (second from right), the Commission’s program manager, converses with other attendees at the Growing Good Neighbors dinner. (KARA photo)

Checkoff groups tackle nematodes

Because nematodes are a constantly evolving pest, the North Central Soybean Research Program (NCSR) and United Soybean Board have joined forces on a National Soybean Nematode Strategic Plan. Soybean checkoff organizations are working with public universities and agricultural companies to coordinate and support complementary projects to develop short- and long-term solutions for parasitic nematode control.

The strategic plan encompasses research, education and outreach efforts with the ultimate goal of increasing soybean farmers’ profit potential and realizing higher yields in the face of growing nematode threats. A detailed description of its objectives and expected farmer benefits can be found at http://TheSCNCoalition.com on the web.

The SCN Coalition is helping share information about the strategic plan and research progress with soybean farmers and the industry.

“We’ve managed soybean cyst nematode, or SCN, for over 30 years with basically one tool: resistant varieties. Unfortunately, 95% of SCN-resistant varieties have the same genetic source of resistance,” said Doug Jardine, a plant pathologist at Kansas State University (K-State). “We essentially have created more aggressive SCN populations that can overcome our main management tool, so we need to find new solutions for soybean farmers.”

The SCN Coalition is asking farmers to determine their nematode numbers with soil testing, rotate resistant varieties, rotate to non-host crops and consider nematode-protectant seed treatments.

Longer term, checkoff-funded researchers are working to develop new solutions and an integrated, multi-pronged approach to managing SCN, including native and biotech traits, chemistries, biologicals, management practices, and rotation strategies.

The SCN Coalition is a partnership formed to increase the number of farmers who are actively managing the pest. The partners include university scientists; national, regional and state checkoff organizations; and corporate entities.

Each year, the Kansas Soybean Commission contributes about $250,000 to NCSR and funds more than $500,000 in production research at K-State, which is one of the coalition’s university partners.

Tomorrow’s energy leaders attend National Biodiesel Conference, Expo

A dozen university-level science majors interested in learning about all aspects of the biodiesel industry received travel scholarships to attend the National Biodiesel Conference and Expo, Jan. 21–24 in San Diego, California. Some of the students who are members of the Next Generation Scientists for Biodiesel (NGSB) also received invitations to present their research.

NGSB is a National Biodiesel Board (NBB) program intended to foster professional relationships between budding and established scientists, share accurate information, and increase collaboration between academia and the biodiesel industry.

Student opportunities included poster and breakout sessions to present their research, a preconference overview, and a private mentoring mixer with prominent biodiesel scientists from across the nation.

The scholars came from 12 universities. NBB, the National Biodiesel Foundation and the United Soybean Board sponsored their $600 travel reimbursements and complimentary registrations.

The Kansas Soybean Commission also sponsored student-attendees from the University of Kansas, Kansas State University and Seward County Community College.

To learn about the event, visit http://BiodieselConference.org on the web. For information about the scholarship program, visit http://BiodieselSustainability.com.