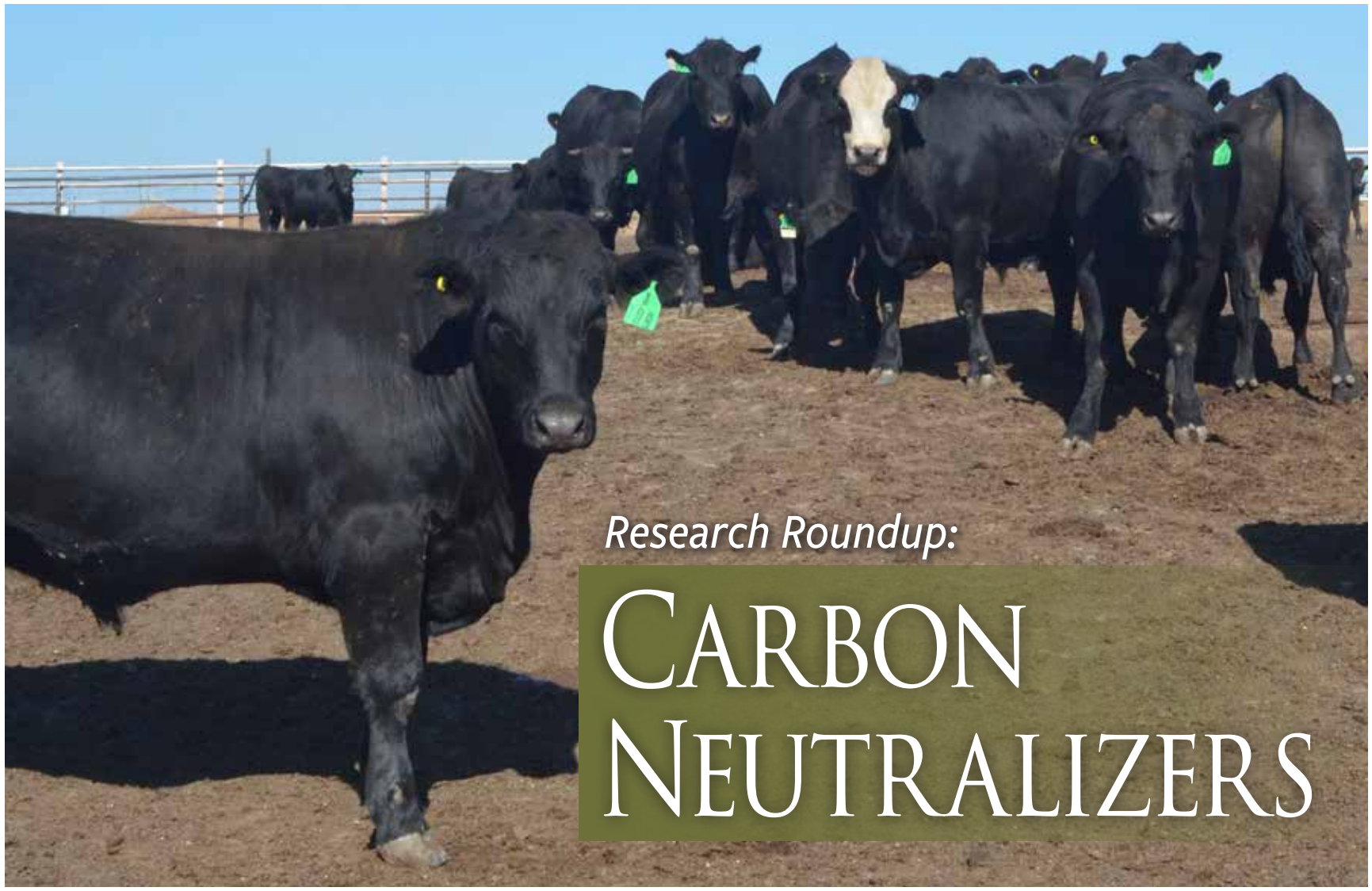

PHOTOS BY SHAUNA HERMEL

Research Roundup:

Carbon Neutralizers

October 2022

Research positive on beef system's environmental hoofprint, shows opportunity to improve even more.

by Troy Smith, field editor

Normally, sustainability stuff just isn't on the agenda. The Gudmundsen's annual open house typically draws a pretty "ranchy" audience. They're mostly graziers — people whose forage-based operations support cow-calf or stocker enterprises, or both. These producers expect to hear the results of research projects related to the nutrition and reproduction of cattle managed on range. They expect to hear about grazing systems, animal health management, and calf and feeder-cattle marketing because those are typical areas of study at the Gudmundsen Sandhills Laboratory (GSL), the University of Nebraska–Lincoln (UNL) research ranch located near Whitman, Neb.

Considering its range production focus, neither do GSL Open House attendees typically expect to hear much from a feedlot guy. However, the August 2022 event included a presentation by UNL Extension Beef Feedlot Specialist Galen Erickson, who talked about beef industry sustainability studies in Nebraska and elsewhere, and the search for ways to address greenhouse gas (GHG) emissions.

Erickson suggests the work should matter to all producers because the industry as a whole is criticized, though often unfairly, for its environmental footprint. It should matter to graziers in particular, because they and the grasslands they manage play important roles in the carbon cycle and the mitigation of greenhouse gases. They may play a bigger role than they realize.

"I believe days grazing and grazing systems will be our saving grace for carbon uptake in the beef system," stated Erickson, referring to the cattle contribution to carbon recycling and recent research suggesting that carbon recycled through grazing lands can more than offset their cattle emissions.

Reducing emissions

Erickson talked about studies evaluating methods of reducing emissions, and methane in particular, through manipulation of cattle diets. He described how a former sheep barn on the UNL campus was converted to allow measurement of methane and carbon dioxide (CO_2) emissions of feedlot cattle, on a pen basis, while testing feed additives intended to reduce the amount of enteric methane produced as a byproduct of ruminant digestion. More specifically, the objective is to reduce methanogenic bacteria among the microbial population within the rumen.

Some feed additives show real promise, said Erickson. Others, not so much.

FATS are a high-energy source that can be included as part of the diet and have been shown to inhibit methane-producing microbes, thus reducing methane production. According to Erickson, adding fat to feedlot diets can

reduce methane emissions by about 15%. That's been shown through multiple studies at UNL and the U.S. Meat Animal Research Center (USMARC) at Clay Center, Neb.

PLANT EXTRACTS. Erickson alluded to numerous claims that various plant extracts can be added to cattle diets to reduce methane production, including tannins and essential oils. Several have been tried *in vitro,* in a laboratory setting, and shown to inhibit methane production. However, when tested *in vivo* — in live animals — many of the natural extracts did not deliver the desired results.

"There's a long list of natural ingredients that are being tried," he noted. "Some may work; some may not."

MICROBIALS. "The same is true for direct-fed microbials," said Erickson. "[Proponents] may tell you to feed a certain product to cattle and it'll cut methane. I would challenge that in the absence of good data. I want it to be proven."

According to Erickson, **monensin** (trade name Rumensin®) is a familiar product that has been proven to affect methane production. At least it's been shown to work when fed to dairy cattle. However, the effect seems to be transitory, lasting up to six weeks, after which monensin is no longer effective.

A product that has substantial proof of efficacy is **3-Nitrooxypropanol, or 3-NOP.** Research shows it can reduce methane production by up to 50% in beef cattle on feedlot diets and 30% in beef cattle on forage-based diets. Likely to be marketed under the trade name Bovaer®, 3-NOP is a synthetic product developed specifically for reduction of methane. It is approved for use in the European Union, Brazil and Chile. However, it is not yet approved for use in the United States.

"This one is coming. That's my prediction," stated Erickson, "but it still has to be FDA-approved. Once it is, we'll have a tool that works."

BIOCHAR. Touted as a useful tool for a variety of ag purposes, biochar is most often used as a soil amendment. Biochar is black carbon produced from biomass sources such as wood chips, plant residues, manure or other ag waste products. Also proposed as a feed additive to reduce enteric methane, biochar research at UNL has been disappointing.

"We've done a lot of studies with biochar," explained Erickson, noting that there are many different kinds. "The ones we've tested have had shown zero impact on methane produced by cattle."

RED SEAWEED is another feed additive that shows promise for reducing methane production. According to Erickson, it appears to be effective, but also results in reduced feed intake. This raises questions about how cattle performance might be affected. Neither is red seaweed approved for use in the United States. Still, with seaweed and other approaches undergoing further testing, Erickson believes it's only a matter of time before feed additive options are approved and methane production is cut by 30%-50%, at least in feedlot cattle.

Research accomplished thus far suggests grazing systems are already part of the solution to the whole greenhouse gas issue.

"We need to do it, and it will happen," stated Erickson, but it won't be the result of government mandate.

He predicted adoption of methane-reduction practices will be driven by consumers and food companies applying pressure to their beef suppliers. Processors and packers will then pressure feedlot operators.

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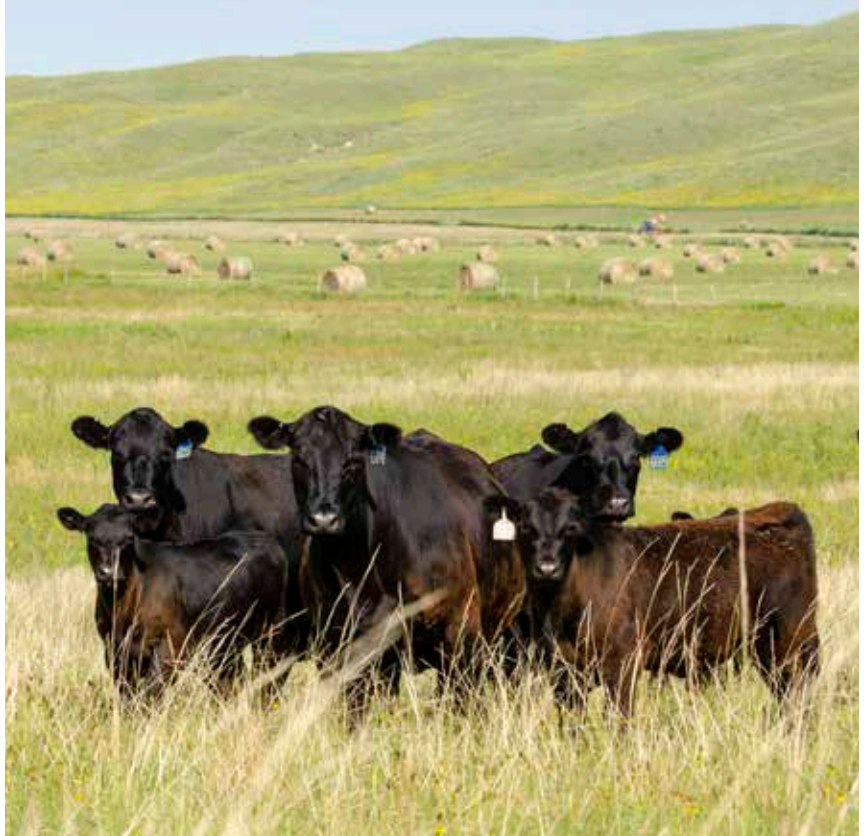
>
> *— Galen Erickson*



Grazing options

Options for reducing methane produced by grazing animals will likely be more limited. However, that may not be such a big problem, as further research quantifies the role grazing systems play in the recycling of carbon. Erickson said the fact that grazing lands sequester carbon is often ignored, but it is important. Research accomplished thus far suggests grazing systems are already part of the solution to the whole greenhouse gas issue.

Erickson described innovative UNL research that has looked at the whole cattle production system — including when cows and their calves are on grass together and the time when cows are dry, plus the calves' postweaning growing and finishing phases — to compare carbon uptake by the grazing land with the collective GHG emissions of all animals in the system. The objective was to measure the net carbon exchange.

Most encouraging were results from a conventional eastern Nebraska system where spring-calving cows grazed predominately cool-season pasture in the summer (175-185 days). The cows then grazed cornstalks after their calves were weaned, followed by a short drylot period prior to going back to grass in the spring. Results suggested cattle were better than carbon neutral.

"In this example for 2020, in eastern Nebraska, the pasture took up more than enough carbon to offset all of the greenhouse gas carbon equivalents produced for the whole system, from birth to slaughter," said Erickson.

"We need more years and more systems in more locations. We need to go west from eastern Nebraska. There's a whole lot more things I want to measure and have a lot more data on before we conclude this work," added Erickson. "But I'm telling you, for 2020, it's pretty exciting. And that's coming from a feedlot person."

Editor's note: Troy Smith is a freelance writer and cattleman from Sargent, Neb. To listen to Erickson's presentation at the Gudmundsen Sandhills Laboratory 2022 Open House, visit *https://bit.ly/GOH-Erickson.*