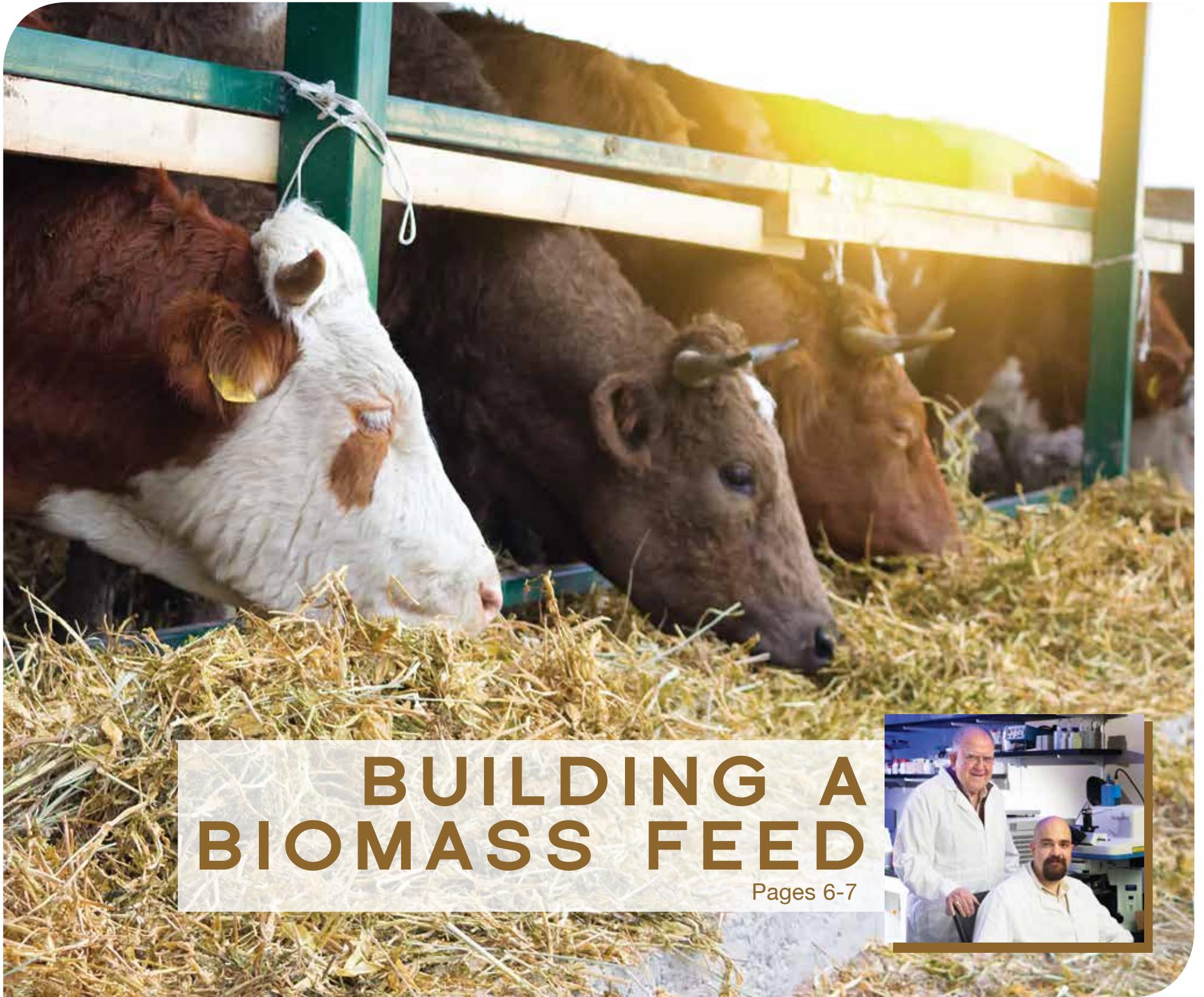




# Ag Innovation News

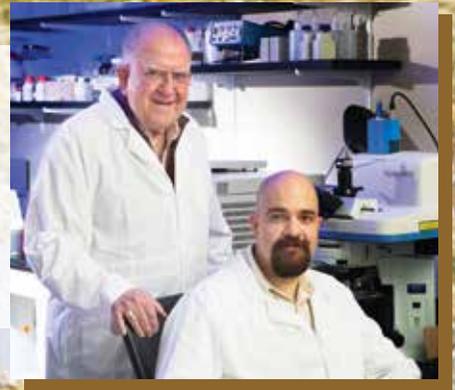
Oct-Dec 2015, Vol. 24, No.4

The newspaper of the Agricultural Utilization Research Institute



## BUILDING A BIOMASS FEED

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# Wood working

Minnesota Renewable Energy Roundtable explores opportunities and risks of wood power



BY LIZ MORRISON

Southeastern Minnesota could use its abundant wood supply to generate biomass power.

That's one of the messages from a recent meeting of the Minnesota Renewable Energy Roundtable, held July 17 in Rochester. First convened in 2006 by AURI, the Roundtable brings people and ideas together to spur renewable energy development. "Every organization represented at the Roundtable brings varying perspectives and understanding of renewable energy," says Nan Larson, AURI's director of innovative networks. In addition, the Roundtable connects entrepreneurs with resources and scientific expertise, helping to speed up commercialization of new products and ideas, she says.

"This event put woody biomass on the table as a legitimate source of renewable energy for Rochester and southeast Minnesota," says Angela Gupta, a University of Minnesota Extension forester in Rochester.

The Rochester area produces about 1.6 million green tons of hardwood and softwood per year, but consumes only about 500,000 tons, according to a 2014 survey by the Minnesota Department of Natural Resources.

Rochester recently launched a 20-year, \$6 billion economic development effort that aims to make the city a global health care hub. Destination Medical Center (DMC) plans to expand Rochester's famed Mayo Clinic facilities and transform the city's downtown core.

The ambitious public-private partnership offers an opportunity to rethink Rochester's energy goals, Gupta says. In public meetings about DMC goals, community members expressed "a clear priority to have a sustainable city," she says.

Other local communities are already operating wood power plants that simultaneously generate electricity and thermal energy from a single fuel source — a system known as combined heat and power, or CHP. Modern CHP plants are more efficient than

either electric or thermal power plants, offering about 80 percent efficiency, says David Ripplinger, bioenergy specialist at North Dakota State University Extension. More efficient energy production means lower operating costs and fewer greenhouse gas emissions, he says.

St. Paul's District Energy, for example, heats and cools the downtown with a 25-megawatt CHP plant fueled by urban wood waste. Using wood waste as biofuel keeps the material out of landfills, furnishes an economical way to dispose of damaged and diseased trees and tree trimmings, and offers stable fuel costs, says Ken Smith, CEO, District Energy St. Paul.

On the small end of the scale, Gunderson Health Systems in LaCrosse, Wisconsin, operates a 800 horsepower wood CHP plant, which powers the 325-bed medical center. In 2014, the power plant used 16,300 tons of wood, saving \$260,000 over the cost of natural gas, says Alan Eber, manager of engineering and energy management at Gunderson Health Systems.

The Renewable Energy Roundtable explored key wood biomass power issues, including:

- Federal and state biomass power policies and incentives
- Biomass CHP plant economics
- Wood supplies and supply chain issues in southeastern Minnesota
- Risk assessment tools for screening potential wood power plant sites

To learn more and view presentations from the event visit <http://www.auri.org/help/innovation-networks/minnesota-renewable-energy-roundtable/july-17-2015-event/>



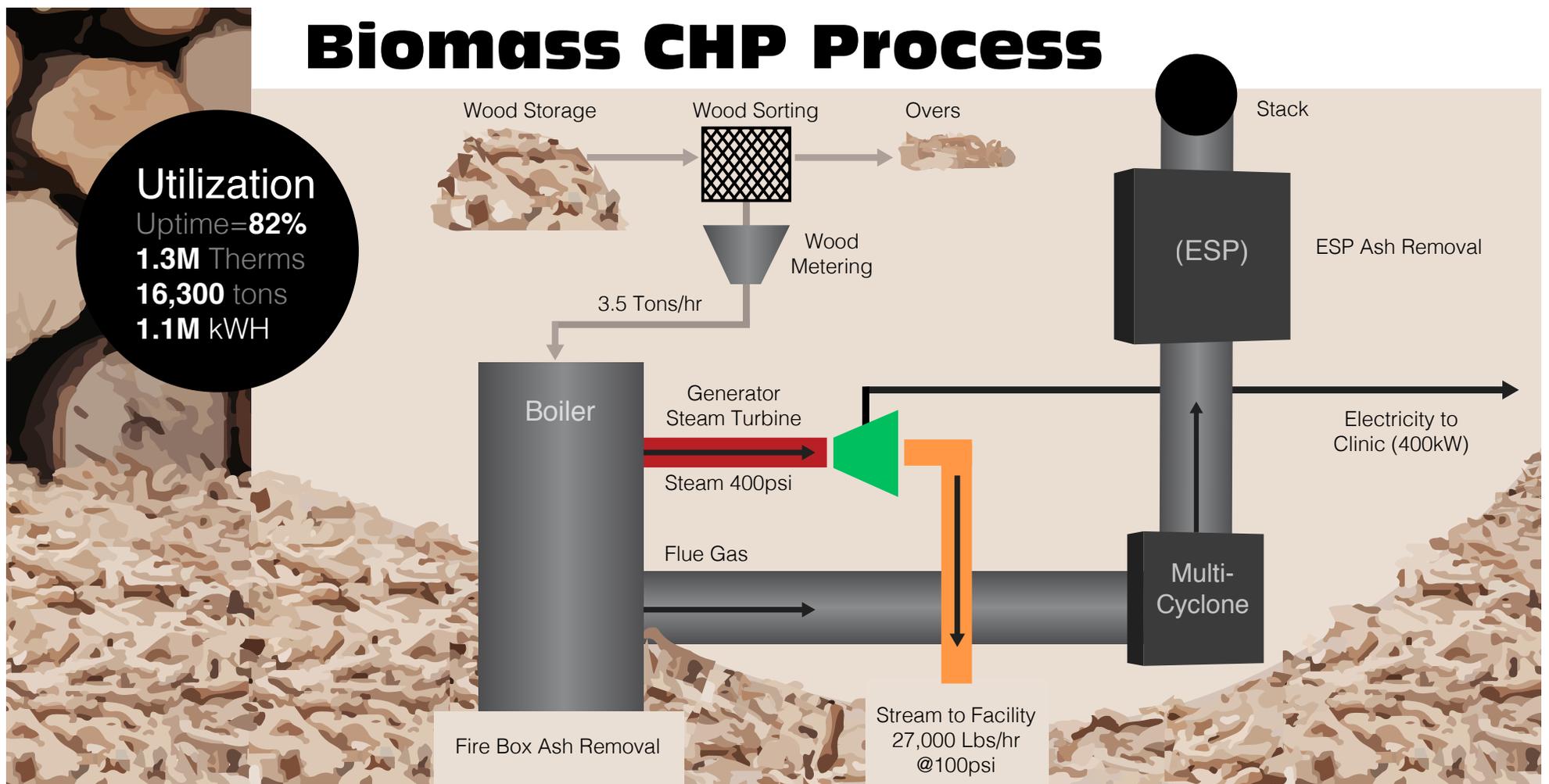
## Southeast Minnesota Wood Supply

(Annual green tons)

Radius from Rochester, Minn.	Hardwood	Softwood	Total
50 miles	1.5 million	135,000	1.6 million
100 miles	4.75 million	875,000	5.6 million
150 miles	9.1 million	1.9 million	11 million

Source: Mark Lindquist, Minnesota Department of Natural Resources, from a 2014 Minnesota Department of Natural Resources survey.

# Biomass CHP Process



Gundersen Health Systems in LaCrosse, Wisc., operates a 800 HP combined heat and power system that generates heat and electricity from wood.

## Spurring green energy innovation

### Minnesota's Renewable Energy Roundtable brings people and ideas together

BY LIZ MORRISON

The Minnesota Renewable Energy Roundtable aims to make Minnesota a national and global leader in green energy.

First convened in 2006 by AURI, the Roundtable brings people and ideas together to spur renewable energy development. Today, participants represent more than 200 Minnesota businesses, government agencies, universities, economic development groups, and non-profits from all over the state, says Nan Larson, director of AURI Innovative Networks. Partner organizations include:

- AURI
- University of Minnesota
- Minnesota State Colleges and Universities
- Minnesota Department of Commerce
- Minnesota Department of Agriculture

The Roundtable provides a regular forum to share research and new ideas with people who have the know-how to bring promising innovations to market, Larson says. Among the topics that have been explored at recent Roundtables:

- Wood biomass uses and opportunities
- Biomass combined heat and power opportunities and economics
- Emerging technologies for high-value molecules from biomass
- Biofuel policy and regulation

A Roundtable coming up later this year will focus on producing commercial biogas from anaerobic digestion of agricultural wastes.

One of the most important Roundtable benefits is networking, Larson says. "Every organization represented at the Roundtable brings varying perspectives and understanding of renewable energy." In addition, the Roundtable connects entrepreneurs with resources and scientific expertise, helping to speed up commercialization of new products and ideas, she says.

Roundtable exchanges and networking have laid the groundwork for many renewable energy ventures in the state.

One of the most significant is biodiesel, says Doug Root, a renewable energy scientist at AURI's Marshall lab. Many Roundtable participants had a hand in developing and promoting federal and state biodiesel mandates, which created a market for the renewable transportation fuel made from soybean oil. In 2014, Minnesota became the first state to require all diesel fuel sold in the state to be 10 percent biodiesel in the summer and 5 percent in the winter.

The Roundtable has sparked innovation in other renewable energy areas, too:

<p><b>Biomass gasification.</b> Several Minnesota companies have experimented with gasification, and the University of Minnesota in Morris operates a corn stover gasifier, which heats and cools the campus.</p>	<p><b>Minnesota GreenStep Cities.</b> Initial discussions at the Roundtable were the impetus for this state assistance and recognition program, which helps cities reach their sustainability goals.</p>	<p><b>Renewable energy workforce needs.</b> Roundtable participants helped identify renewable energy workforce training needs and gaps, leading to new courses at the Minnesota State Colleges and Universities System.</p>
<p><b>Biofuel use in gas turbines.</b> Several Roundtable organizations, including Xcel Energy, have worked together to test the feasibility of using biofuels in gas turbines.</p>	<p><b>Biobutanol experimentation.</b> Biobutanol production has been explored at Roundtables for several years. Three Minnesota companies are examining this technology.</p>	<p><b>Expanded use of ethanol and biodiesel coproducts.</b> Research and development by Roundtable participants has led to more use of distillers grains, glycerin and other renewable energy processing coproducts.</p>



# Minnesota: The land of 10,000 shrimp?

**Minnesotans love seafood.** While the state is home to the popular walleye, that's not always what's on the menu. According to the National Oceanic and Atmospheric Administration (NOAA), 90 percent of the U.S. seafood consumption is imported and most of that is shrimp. Per capita, Americans consume about 4.9 pounds of shrimp per year.

BY LUKE O'NEILL

About half of the seafood the U.S. imports is farm-raised. AURI recently partnered with the Minnesota Soybean Research and Promotion Council (MSR&PC) to convene experts in the field of inland fish and shrimp production for a forum examining opportunities for shrimp farming in Minnesota. The event took place at the MinnWest Technology Campus in Willmar and began with a welcome from Minnesota Department of Agriculture Commissioner Dave Frederickson.

## The potential

How much could aquaculture benefit Minnesota's economy? Nicholas Phelps, associate professor at the University of Minnesota's School of Veterinary Medicine, explained that aquaculture is the fastest growing animal agriculture sector with trade of its products worth a whopping \$130 billion in 2012. Aquaculture currently encompasses 181,000 jobs nationwide.

The potential for substantial growth exists but would require investment. Phelps concedes that barriers to expanding aquaculture operations within Minnesota and nationwide do exist. As interest in aquaculture products increases, stringent regulations will become a bigger part of the industry. Phelps added that aquaculture requires access to usable water and land, which may pose a problem in states currently with limited water supplies or shrinking farm land. Although those are important considerations and necessary challenges to overcome, Phelps said they do not represent insurmountable roadblocks.

"This need could be addressed by building out the value chain in the aquaculture industry to identify gaps and make them economic opportunities instead of unmet needs," says Nan Larson, AURI's director of innovative networks. "This event and the follow-up to occur is a great example of what AURI's Innovation Network Program seeks to accomplish: bringing the right people together at the right time to lead to the commercialization of ideas, products, technologies and ultimately economic development in the value-added agriculture arena."

## Implementation

The next challenge for shrimp and fish production is implementation. Professor Emeritus Addison Lawrence, chief technical officer of trū Shrimp Systems, aquaculture specialist and world-renowned shrimp expert, has developed patented technologies, feeds and methods for inland shrimp production. Lawrence is an industry pioneer, serving in many roles including project leader and scientist, at Texas A&M University.

“Aquaculture is our growth industry,” Lawrence said. “It is going to provide that needed, ample, extra protein source in the future.”

Moving shrimp production indoors allows for complete environmental control, which maximizes yield potential and limits exposure to potentially devastating diseases explained Lawrence.

Lawrence developed a raceway technology, which was patented by Texas A&M University System and licensed to Marshall, Minnesota-based trū Shrimp Systems of Ralco Nutrition, Inc., with the goal of making shrimp products as commercially prevalent and affordable as chicken. This technology consists of a basin with continuously circulating currents that maintain water quality and promote robust shrimp production. Lawrence said this is vital because shrimp are susceptible to diseases and other potentially devastating biosecurity threats.

Compared to importing frozen fish, domestic aquaculture contributes to increased traceability within the seafood industry. This means that products can be more easily traced back to the source said Lawrence.

trū Shrimp Systems is currently building an expansive research facility in Balaton, Minnesota. In addition, they have developed a shrimp farm model titled “Balaton Bay Harbor.” The model calls for multiple stacked raceways called “reefs.” The goal is to eventually build a shrimp farm near Tracy, Minnesota.

Shrimp could be fed a soybean-based diet. NutriVance, produced by Midwest Ag Enterprises, is derived from soybean meal, providing high-quality protein concentrate for fish and shrimp as well as other young animals. According to Jim Moline, President of Midwest Ag Enterprises, NutriVance is a superior alternative to traditional fish meal that will reduce feed costs, increase feed intake and facilitate growth. It will also provide another market opportunity for Minnesota-grown soybeans.

## The appeal

Mike Ziebell, general manager of trū Shrimp Systems, a division of Ralco, explained that inland shrimp production is well received by consumers for several reasons including excellent and consistent flavor, superior texture, alignment with organic or vegan product standards and a reduced carbon footprint.

Soybean farmers could benefit as well, because 30 percent or more of every pound of shrimp feed comes from soybeans, a true value-add for the soybean industry, as well as other crop potential in Minnesota. Harold Stanislawski, AURI project development director indicated that the Ralco Minnesota aquaculture inland production model is a significant technological advancement in the industry with value-added benefits for Minnesota.

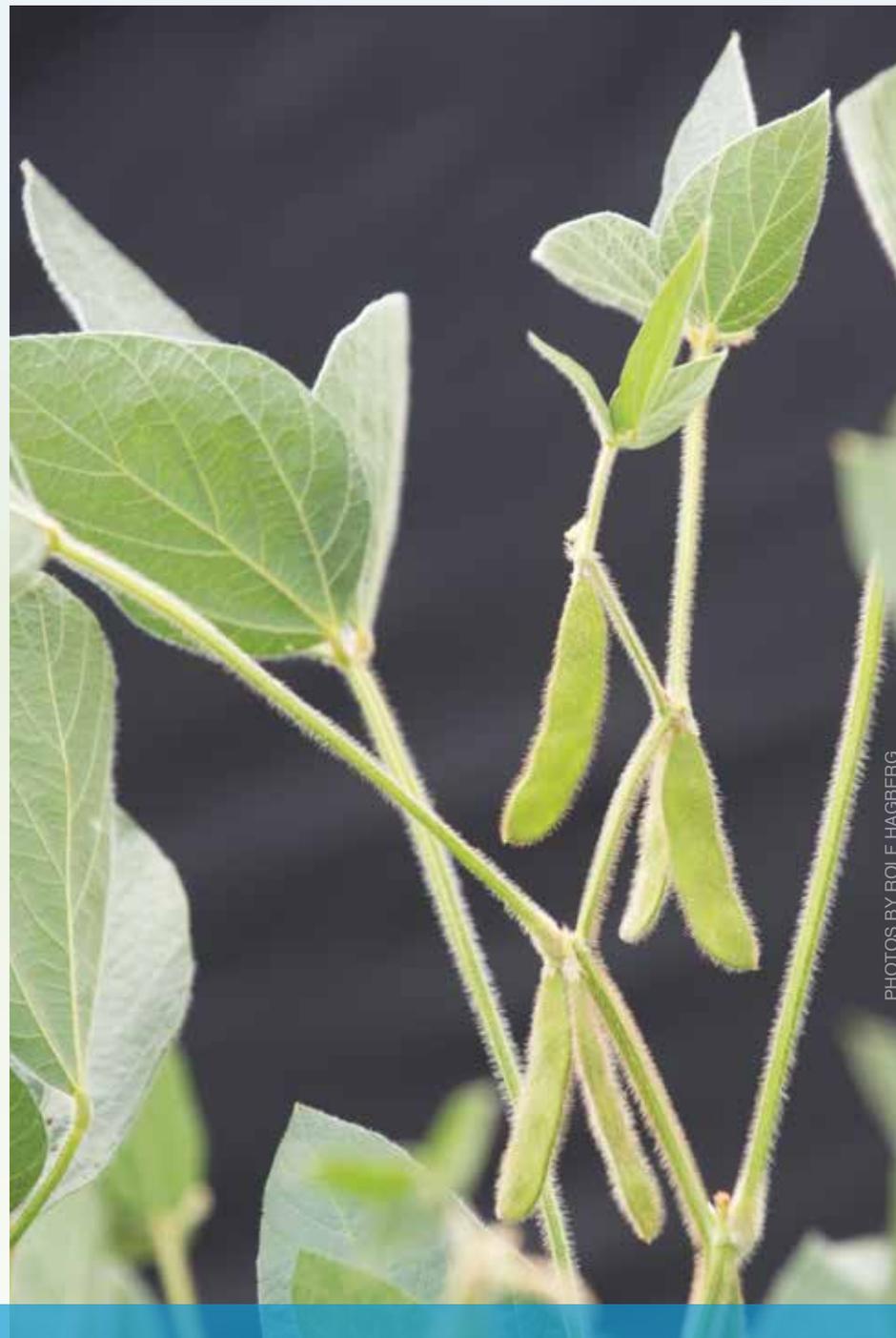
Aquaculture offers an economic boost to state economies in sale of its products and the associated technologies.

Other speakers shared their depth of knowledge with the group, including Paul Pierson from USDA, Dave Roeser from Garden Fresh Farms, and Zachary Robinson from Spark-Y.

## AURI's role

AURI is committed to developing new uses for agricultural products. Indoor aquaculture could be a new, emerging opportunity to add value and create new agricultural opportunities. “AURI is having an open mind and listening to everything that is going on in the agriculture, aquafeed and feeding industries,” said Moline. “It can only help us further our cause to develop products that are going to generate more added value back to our farmers.”

“As we continue to grow and further progress, our company is going to create more jobs and more opportunities for Minnesota,” Moline adds.



PHOTOS BY ROLF HAGEBERG

Indoor aquaculture could be a new, emerging opportunity to add value and create new agricultural opportunities. Shrimp could be fed a soybean-based diet and with each acre of shrimp needing 1.5 million pounds of feed, it's a true value-add for the soybean industry.



Minnesota Department of Agriculture Commissioner Dave Frederickson welcomed over fifty attendees to the forum.

# MAKING CORN STOVER MO



## Grower cooperative commercializing new

BY LIZ MORRISON

A farm cooperative and a high tech company are joining forces to make corn stover a more nutritious cattle feed.

Ag Ventures Alliance Cooperative (AgVA) and Cellulose Sciences International (CSI) plan to commercialize a new process that unlocks the carbohydrates in biomass, improving digestibility. In April, the two companies formed Stover Ventures, which will bring CSI's patented feed treatment to market.

The new enterprise would offer farmers another source of revenue from their cornfields, says Becky Philipp, AURI project manager. Dairy and beef producers would gain an alternative feedstuff that could be substituted for some corn. The venture could also create new jobs in corn stover harvesting and processing.

AURI is helping the start-up with technical analysis, livestock feeding trials and quality assurance.

### Looking for opportunities

Ag Ventures Alliance is a 400-member cooperative based in Mason City, Iowa. Most of the members are farmers from southern Minnesota and northern Iowa. The group, founded in 1998, starts new businesses that add value to farm commodities, says Brad Saeger of Willmar, Minnesota, who is leading the Stover Ventures commercialization effort.



Brad Saeger is leading the Stover Ventures commercialization effort.

AgVA focuses on the early phases of business creation—identifying good opportunities and working on organization, financing, marketing and start-up. The goal is to provide new investment opportunities for co-op members, Saeger says.

Farmer-members are especially interested in ideas for adding value

to abundant corn stover—the stalks, leaves and cobs left in the field after the grain is harvested.

In corn following corn rotation fields in southern Minnesota and northern Iowa, it's a challenge to manage ever-increasing mounds of corn residue. In today's high-yielding environments, corn stover production often "exceeds the minimum amount needed to maintain soil health," Saeger says.

Removing some corn residue can be an agronomic advantage, says AURI coproducts scientist Al Doering, who is also a farmer. Soil warms up faster in the spring, disease pressure drops, and there is often times a reduced fertilizer and tillage requirement.

Corn stover processing opportunities include cellulosic ethanol and other fuels, chemicals and livestock feed. Biofuel and chemical ventures require huge capital investments: a commercial cellulosic ethanol plant, for example, is a \$600 million undertaking, Saeger says. "We wanted to find something with a lower entry cost that could still add value to corn stover."

That search led AgVA to Cellulose Sciences International, a small technology company based in Madison, Wisconsin.

### Breaking down biomass

CSI was founded in 2007 by chemist and veteran cellulose researcher Rajai Atalla, a retired scientist with the U.S. Forest Service's Forest Products Laboratory.

Atalla invented a process that opens up the complex chains of molecules in lignocellulosic biomass making them nanoporous, releasing the valuable carbohydrates bound up in plant fibers. The treatment not only boosts the nutritional value of corn stover, but also speeds up digestion, he says.

In 2013, Atalla made a presentation on the technology at the Midwest Innovation Summit, which caught the attention of Ag Ventures Alliance. The concept "was easy for growers to understand," Saeger says, "with a low start-up cost, and limited risk to deploy in the short term."

### Efficient, a good fit

AURI helped AgVA fund laboratory evaluations of the CSI process and comparisons with several rival biomass treatments.

The CSI treatment looked like the best choice for AgVA, Saeger says. It uses a mixture of common chemicals—sodium hydroxide, ethanol and water—to release the nutritious sugars in chopped corn stover. Unlike other treatments, CSI's process does not require high temperatures or pressure, Atalla says. The process, which takes about an hour, produces 1,700 pounds of feed per ton of corn stover, an 85 percent yield. Nearly all of the processing chemicals can be recovered and reused, pushing down the cost.

"The CSI process looks very promising," Doering says. "It's an efficient way to obtain a very good feed product."

In addition to digestible feed, the CSI treatment also yields two specialty chemicals ferulic acid and para-coumaric acid, potent antioxidants that have high value as food, pharmaceutical and cosmetic additives. These compounds could be worth as much as the feed itself, Saeger says.

The CSI process has other advantages for AgVA, Saeger adds. It's well-suited to small, centralized plants that would handle about 100,000 tons of corn stover a year, collected from a 20- or 30-mile radius. A plant that size would cost an estimated \$14 million to build said Saeger. He estimates that processing will add \$50 to \$100 per ton to the value of corn residue.

# RE DIGESTIBLE



A unique, new process that unlocks the carbohydrates in corn stover making it more digestible for cattle feed is being commercialized.

PHOTO BY ROLF HAGBERG

## livestock feed treatment

The AgVA venture is also well-timed to take advantage of innovations in corn stover harvesting and handling, Saeger says. These advances are being driven by the cellulosic ethanol industry, which is working with farmers and custom harvesters on efficient, sustainable stover collection methods. That expertise will also benefit farmers who want to supply corn residue to Stover Ventures, Saeger says.

### Moving forward

This summer, Stover Ventures produced its first batch of treated corn residue at the USDA Forest Service forest products pilot plant in Madison. Feeding trials at the University of Wisconsin will evaluate the treated stover's nutritional and economic performance in dairy cow rations.

Earlier studies at Iowa State University concluded that alkali-treated corn stover and distillers grains could replace up to 20 percent of corn in cattle rations, without lowering growth. Preliminary cost estimates suggest that the treated feed could be price competitive whenever corn prices approach \$4 per bushel, Doering says.

If feeding trial results are favorable, Stover Ventures will identify potential sites for its first processing plant. Several counties in southern Minnesota are strong candidates, Saeger says, offering high corn yields and proximity to large cattle populations.

AgVA has committed \$500,000 in seed money to launch Stover Ventures. If all goes well, commercial production could begin as early as 2017, Saeger says. He adds: "The treated corn stover project is one of the single best opportunities for a cooperative-style business we have encountered since the early ethanol years."



Rajai Atalla of Cellulose Sciences International is working with AgVA on a biomass treatment.



#### Idea to reality:

Ag Ventures Alliance (AgVA)—a cooperative made up of farmers from Iowa and Minnesota—was looking for ways to add value to corn stover.

#### AURI's role:

AURI helped the cooperative evaluate a new biomass treatment developed by Cellulose Sciences International (CSI). The treatment makes corn stover more nutritious, increasing its feed value.

#### Outcomes:

In spring 2015, AgVA and CSI formed Stover Ventures to commercialize CSI's corn stover feed treatment. The company will produce its first batch of treated corn stover feed this summer. Dairy cow feeding trials also begin in summer 2015 at the University of Wisconsin.

#### Partners:

USDA Rural Cooperative Development Program

## Investing in Minnesota value-added agriculture

Ag Ventures Alliance Cooperative and its members have invested in many value-added agribusinesses in Minnesota and Iowa. Profits from these investments are used to fund new business development. Some of the Minnesota-based companies that Ag Ventures Alliance has taken a stake in:

- **Golden Oval Eggs**, Renville, processes eggs;
- **Minnesota Soybean Processors, Brewster**, manufactures soybean meal and biodiesel fuel;
- **Feed Logic, Willmar**, makes robotic livestock feeding systems;
- **Once Innovations**, Plymouth, produces confinement barn lighting technology.

# Heavenly Hunks

## Finding success in a gluten-free market

BY DAN LEMKE



After earning a business degree Casey Webber (left) began E&C Snacks using Ella Redmond's (right) family recipe. Heavenly Hunks are a cross between a cookie and a muffin and the line is entirely gluten-free.

Ella Redmond's cookies have long been a family favorite. She's been baking them for more than 30 years, but often in limited supply, so her nephew, Casey Webber admits to hoarding cookies when he was fortunate enough to get some.

Two and a half years ago, Webber was finishing up his business degree at Arizona State University. Redmond sent a supply of cookie hunks his way and the light bulb went on for Casey. After taking some time to convince his aunt that her cookies were ready for more than just family, Webber did some research, put together a business plan and decided the time was right to start a cookie company. After he graduated, the duo started a company called E&C Snacks based in Eden Prairie.

Ella and Casey took some time to develop the products and packaging for their Heavenly Hunks before diving into the market. The cookie hunks are akin to a cross between a cookie and a muffin and are made with simple, wholesome ingredients like butter, oats and raisins.

Making the leap from family favorite to retail product brought Webber to AURI where technical staff Donna O'Connor, Carissa Nath and Ranae Jorgenson helped him navigate various aspects of product development. AURI staff provided assistance in formulation, shelf life testing, nutritional analysis and even conducted sensory taste panels to gauge consumer acceptance of their cookies.

"AURI really helped us clarify a lot of things and have been a great resource for us," Webber says. "Everything that large companies have departments for, they've been able to do for us."

Once formulated and compliant with all the necessary regulations required before they could be sold, the Heavenly Hunks cookie chunks found some market success. But a recent formula change has Webber and Redmond excited for the future.

### Going gluten free

Webber says toward the end of 2014, they were at a bit of a standstill as they worked on a rebranding effort.

At that time, Webber researched the potential of adding a gluten-free product line. Gluten-free flours were expensive, so after some research and trial, he developed his own proprietary blend. The only real way to know if going gluten-free was possible was to make some cookies and taste them.

"I made some cookies that were gluten-free and some that weren't," Webber recalls. "I had my aunt try them both and she couldn't tell the difference."

At the beginning of 2015, they relaunched the Heavenly Hunks line as entirely gluten-free. They come in four different varieties, including Original Oatmeal, Oatmeal White Chocolate Chip, Oatmeal Chocolate Chip and Oatmeal Raisin. They're available in 2- and 8-packs.

The change to gluten-free has been a good move for E&C Snacks in part because it capitalizes on a trend toward products with clean labels and simple ingredients.

"Today's consumers continue to examine the foods they eat and are looking for clean-labeled products. They're also avoiding artificial ingredients, chemicals and overly-processed foods," O'Connor says. "They are looking for products that will provide wholesome nutrition, particular health benefits and something that satisfies their tastes."

The number of "free from" foods continues to rise globally, led by gluten-free products. In a 2014 product launch review by Innova Market Insights, new items that were positioned as gluten-free accounted for 9 percent of total global food and beverage introductions. The U.S. saw a 17 percent increase in gluten-free product introductions. Key product areas include bakery items, cereals and snack foods.

### Experiencing growth

"It's a little like going downhill without brakes," Webber quips about the growth that has occurred since relaunching the gluten-free line.

Webber says the company didn't start out intending to make gluten-free cookies, but he knew it was a rapidly

growing market with growth potential. Some of that growth is being realized as the unique cookie chunks are now available in more than 200 Midwestern store outlets including Lunds&Byerlys, Kowalski's and Coborn's. In addition to grocery stores, Webber says they're available at unconventional retailers like coffee shops and even some airport stores.

"The cookies are almost a nostalgic product," Webber adds. "I like to think of them as a conscious indulgence."

The transition to making gluten-free products has been fairly simple. Webber says they were fortunate enough to find a manufacturer that has gluten-free capabilities.

"It was a big step letting go of the recipe, but it's part of what we had to do as a growing business because we knew we couldn't do it ourselves anymore," Webber adds.

"Heavenly Hunks cookies fit right into this gluten-free consumer trend and they also deliver on taste and quality, plus they are clean-labeled," O'Connor adds. "Their special shape and chewy texture along with the right blend of wholesome, homemade flavors are satisfying and delicious. It's hard to believe they're gluten free!"

Learn more about Heavenly Hunks at [eandcssnacks.com](http://eandcssnacks.com).



### AURi and E&C's Snacks

#### Idea to reality:

Casey Webber and Ella Redmond took her cookie recipe and brought gluten-free cookie hunks to the market.

#### AURi's role:

Scientific staff Donna O'Connor, Ranae Jorgenson and Carissa Nath helped with product formulation, shelf-life testing, nutrition facts labeling, analytical testing and conducted sensory panels.

#### Outcomes:

E&C Snacks Heavenly Hunks cookies are now available in more than 200 retail outlets, primarily in the Midwest.

PHOTOS BY ROLF HAGBERG



For many consumers, if they can't pronounce the ingredients on label, they don't want it.

# Keeping it clean

CARISSA NATH, MEATS SCIENTIST

**If given the choice of two comparable food products, one containing butylated hydroxyanisole and butylated hydroxytoluene or one made with cherry powder, which would you choose?**

If you picked the cherry powder, you're like an increasing number of your fellow consumers. All three ingredients are used to help preserve food for a longer shelf-life. One just sounds a lot more appealing than the others doesn't it?

What was once an emerging trend has quickly become an industry standard. Consumers are paying closer attention to ingredients because they want to know what's in the food they're feeding their families. For food companies, that means a focus on "clean" labels with simple, natural-sounding names. In some cases, that also means fewer ingredients and less processing. The primary implication of the move to cleaner labels and fewer ingredients is a belief that those products are inherently healthier.

The move toward simpler ingredients and cleaner labels cuts across many food categories including beverages, baked goods and meat products. For many consumers, if they can't pronounce the ingredients on label, they don't want it.

The trend toward simpler ingredients is something we at AURI have seen for quite some time. In fact, the movement toward more artisan foods that are less processed and contain simpler ingredients likely started with entrepreneurial businesses looking to set themselves apart from their larger competitors. Having fewer, more natural ingredients helped them fill a niche that has since grown to mainstream.

Consumer demand is driving the trend. As people become more health conscious, they check the label for statements like "all natural" or "gluten-free." Whether for a food sensitivity or allergy, or just because they want to make a change in their diet, people are checking the ingredients to be sure they like what they see.

Formulating recipes with an emphasis on natural ingredients does present some challenges. Ingredients are added to most products because they serve a functional purpose. In many cases, those hard-to-pronounce components are in there because they help preserve food products for longer shelf-life or they may be in the recipe to add color, flavor or serve as a binding agent. They might be used to add sweetness or saltiness to recipes. In some cases they're part of the recipe for food safety reasons, which means finding more natural ingredients that do the same things become even more challenging. Take those ingredients out and taste, texture and appearance of food products can be drastically changed. That may not be an issue when developing new food products, but trying to reformulate existing products with an existing taste and consumer expectations gets a whole lot more challenging.

Fortunately, at AURI we have many years of experience helping Minnesota businesses formulate delicious food products without unnecessary ingredients. We've been able to help hundreds of small- to medium-sized businesses simplify their recipes and offer a cleaner label.

By substituting more easily recognized products like fruit and vegetable extracts for synthetic ingredients, we can help Minnesota businesses capitalize on the wholesome food trend. It takes a lot of science to help formulate food products that don't sound that way.



PHOTOS BY ROLF HAGBERG

Meat Scientist Carissa Nath examines clean labels on meat products.



PHOTO BY ROLF HAGBERG

# Meet Shannon Schlecht

*Editor's Note: Shannon Schlecht's first Executive Director Message will be in the next issue of "Ag Innovation News."*

The Agricultural Utilization Research Institute (AURI) is pleased to welcome Shannon M. Schlecht as its new Executive Director. Schlecht, who most recently served as vice president of policy for U.S. Wheat Associates in Arlington, VA, officially joined the organization in late September. He has assumed overall strategic and operational responsibility for the Institute's staff, programs and execution of its mission.

"We believe Shannon brings the ability, leadership and skills necessary to further AURI's success. His experience and commitment to build collaborative industry relationships will bring new opportunities for our organization, as well as the state's economy," observed Ron Obermoller, chairman of the Institute's Board of Directors.

Schlecht has extensive background in agriculture, policy influence, market development, international trade, strategic planning, and management. He served as a wheat industry representative to the USDA Secretary of Agriculture and U.S. Trade Representative for the Grains, Feed, Oilseeds, and Planting Seeds Agricultural

Trade Advisory Committee, was a liaison to multiple agricultural coalitions, and staff director for national committees covering trade policy and biotechnology as well as a food aid working group. Internationally, he conducted initiatives to develop U.S. wheat exports in over 40 countries. He holds a Bachelor of Science and a Master of Science degree from North Dakota State University.

Schlecht's early work will focus on connecting with AURI's stakeholders to discuss current and potential partnership opportunities.

"I am excited to join AURI and put my experiences to work to help build upon the organization's successful track record. It is a unique organization contributing to Minnesota's agricultural industry in a variety of ways.

"I look forward to the upcoming discussions with AURI's partners and stakeholders throughout the next several months to help advance opportunities for Minnesota and its agricultural industry."

## ELSEWHERE IN AG INNOVATIONS

BY ASHLEY HARGUTH

*Editor's note: As a service to our readers, we provide news about the work of others in ag utilization. Often, research done elsewhere complements AURI's work.*



### Researchers aim to create nonallergenic eggs

Researchers in Australia have begun looking at producing chickens that lay eggs without the proteins that cause allergic reactions in humans. The project will "switch off" the four proteins in eggs that are responsible for most allergic reactions, utilizing RNAi, which is also used to modify crops, and the hope is that these eggs will hatch chickens that lay hypoallergenic eggs. If successful, the eggs could create hypoallergenic vaccines, which currently cannot be used by those with egg allergies.

May 26, 2015, Farmers Weekly

### Sticking to cottonseed

Cottonseed meal – the leftovers after lint and oil are extracted from cottonseed- is typically fed to ruminant livestock or used as a fertilizer. USDA-ARS scientists are working for further uses for this coproduct, namely, wood adhesives. There are 1.3 million tons of cottonseed meal produced each year. The meal can be made into an adhesive, but it wasn't holding up in water. The UDA-ARS has found a new seed-meal washing procedure improves water resistance of the adhesive.

June 2015, USDA-ARS



### Soy saving roads

Biorestor®, made by Asphalt Systems, Inc. (ASI) in Ohio, is an alternative to petroleum-based road restorer products. It has a 95 percent biobased content and uses soy as its main ingredient. Users have found it works in a variety of applications. Some apply the product immediately after laying down the asphalt, some at a later date, and some even use it to rescue an older road. By adding this restorer, you can extend the life of an asphalt road longer than the average 10-12 years. Two other aspects of Biorestor we like, in addition to the fact it works, is that it's less toxic to the environment than petroleum-based sealers and it's made using soybeans that grow right alongside the very roads it protects.

Unitedsoybean.org, July 28, 2015

### From ag waste to packaging

Zelfo Technology and Upgrading, in Germany, have produced an up-cycled wheat straw based packaging concept. This Maco and Nano Fibrillated Cellulose (M/NFC) packaging is made using 100 percent ag waste. The product range will focus on fruit and vegetable containers first.

Foodproductiondaily, May 25, 2015



### Methane powered tractor

The first tractor to run on methane is coming to fruition in Italy. The T6 by New Holland, would run on methane, which is currently 30 percent cheaper than diesel, and for farms that produce their own biomethane, the costs would drop to nothing. Biomethane is a type of gas that is produced by the processing of organic waste. Along with costs savings, the technology would be more environmentally friendly by producing 80 percent less pollution than a standard tractor.

AP The Big Story, August 10, 2015

## AURI'S CORE FOUR QUIZ

How much do you know about AURI's core four areas: food, renewable energy, coproducts, and biobased products? Take the below quiz.

### Food Products

How many pounds of milk does it take to make one gallon of ice cream?

- a. 1
- b. 6
- c. 12

Answer: c

### Renewable Energy

What is bioheat?

- a. Home heating oil mixed with biodiesel
- b. A spicy soy oil
- c. New fuel for farm equipment

Answer: a

### Coproducts

Every bushel of corn processed by an ethanol plant generates 2.8 gallons of ethanol and how many pounds of coproducts that can be used for animal feed?

- a. 5
- b. 17.5
- c. 36

Answer: b

### Biobased Products

How many jobs are related to the biobased products industry in the U.S.?

- a. 850,000
- b. 4 million
- c. 2 billion

Answer: b

## ABOUT AURI

The Agricultural Utilization Research Institute (AURI) helps develop new uses for agricultural products through science and technology, partnering with businesses and entrepreneurs to bring ideas to reality. AURI staff are skilled at walking clients through the entire development journey of bringing a new product or process from idea to reality.

### Service Areas: What We Provide

#### Applied Research

Through practical, applied research we identify emerging opportunities to add value to agriculture products. This information is publicly available in order to help entrepreneurs and businesses generate ideas for new products and processes.

#### Hands-on Scientific Assistance

Scientists are available to provide consulting and technical services in the areas of:

- Product and process development
- Product evaluation and testing
- Sourcing materials equipment and services

#### Innovation Networks

When deciding the feasibility of a new product or process, it is critical to have access to industry experts and a science-based network of people. With a broad range of networks, AURI can help bring together the right people at the right time to help bring new products and processes to market.

#### Learn More

- Contact one of the AURI Offices to speak with a project development director about your business.
- Visit [auri.org](http://auri.org) to see the latest research and learn about upcoming events.
- Sign up to receive the *Ag Innovations News* or the AURI electronic newsletter to stay informed about AURI projects and clients.
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PHOTO BY ROLF HAGBERG

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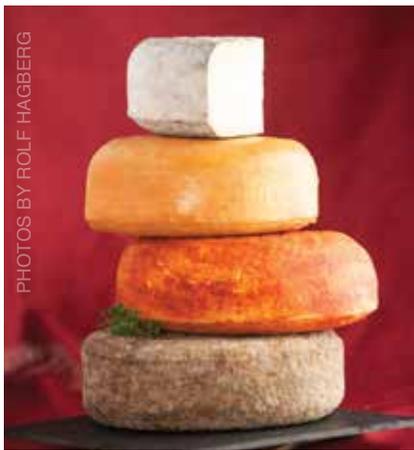
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Lucas and Alise Sjostrom are growing Redhead Creamery into a destination.



Popular offerings at Redhead Creamery include "Lucky Linda" cheddar and "Little Lucy" brie.



PHOTOS BY ROLF HAGBERG

# Couple launches artisan cheese making company at family dairy farm

BY JONATHAN EISENTHAL



Jerry and Linda Jennisen, along with Alise and Lucas Sjostrom and their daughter Lucy, own and operate Redhead Creamery.

Alise Sjostrom realized a longtime dream with the launch in July 2014, of Redhead Creamery, an artisan cheese maker, located on the dairy farm where she grew up. The dairy herd and the cheese company are jointly owned by Alise, her husband, Lucas, and her parents, Jerry and Linda Jennisen.

Production of cave-aged cheddar, fresh cheese curds and other cheeses reached a steady level in October of last year. "Lucky Linda" cheddar (named for Alise's mother) and "Little Lucy," (named for Lucas and Alise's daughter), a six-ounce wheel of brie, are popular offerings. Occasional experiments like cayenne-rubbed cheddar also make brief appearances in the shop's cooler.

"It's a fully operating cheese plant," Alise describes their facility. "We have a tunnel that runs from the milk house to the cheese plant, which runs milk directly from our milking parlor to our pasteurizer tank, so we are using very fresh milk when we make our cheese. We have viewing windows in our cheese plant, and we welcome the public to come and watch if they want to. We also have a retail shop upstairs. We just got our liquor license as well, so we can host beer and wine pairings with cheeses."

Redhead Creamery made use of AURI's cost-share program to finance some of their scale-up and product development costs, as well as pre-engineering costs. AURI also provided product analysis, nutrition fact labeling and troubleshooting assistance during the building phase.

The holiday gift market and a growing network of retailers are a big part of their business, and they have made farmer's markets a key segment too, but the Sjostroms have also created amenities to make Redhead Creamery a destination. They give tours and the addition of a commercial kitchen and a meeting space allows them to host groups up to 40, lunch included.

"We'd like to create curriculum materials, so that the teachers include information about dairy production right in their lesson plan," says Lucas. "And then they can bring the classes out here to see how it's done."

Redhead Creamery recently hosted a class reunion, and in March, AURI held its project and technical staff meeting there.

"We were able to watch the cheese making, sample some of the fresh curds, and enjoy a delicious lunch prepared by them," says Becky Philipp, the AURI project manager responsible for overseeing the financial and technical assistance provided to Redhead Creamery. Philipp says, "They are wonderful hosts. It was a great experience. Their creativity, personable nature and entrepreneurial style serve them very well in their business."

*Check out their latest news at [redheadcreamery.com](http://redheadcreamery.com)*



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