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AG INNOVATION NEWS®

The newspaper of the Agricultural Utilization Research Institute

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READERS!

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Wrapping profits around MEAT

PHOTO BY ROLF HAGBERG

QUICK FACT: AURI clients have created nearly 300 jobs and invested more than $100 million in the past biennium.

EXECUTIVE DIRECTOR'S COLUMN

A job worth doing

BY EDGAR OLSON

OLSON.

There is nothing quite like the feeling that comes from a job well done. The satisfaction from putting sweat and effort into a successful project is a reward unto itself.

At AURI, that's the way we feel when our efforts lead to the development of a new product or the identification of a new market opportunity.

Yet with every success, there is a realization that more needs to be done. There is more research to conduct, more technical troubleshooting and problem-solving to make ag businesses viable, more producers to impact. And ultimately, there are more success stories waiting to be told.

At its base, AURI's mission has always been to provide unique assistance to develop new uses and processes for Minnesota commodities. By providing producers with opportunities to capture more value from what they grow, these new uses are key to strengthening the rural economy. Producers and processors appear to recognize this fact, because the need for AURI assistance has not diminished over time.

On a monthly basis, AURI averages 25 to 30 new projects. These emerging opportunities are added to a list of more than 200 other active projects receiving AURI support. While not all will result in new products or business formations, some will. These successful ventures provide the activity that helps keep the rural economy pumping.

Given the number of opportunities and ideas continually brought forward, there are many needs that remain unmet. But AURI is committed to meeting those needs in our efforts to benefit rural Minnesota.

Now, if you will excuse me, there is work to be done. ■

NEWS BRIEFS

Legislative update

AURI intact but funds cut

St. Paul, Minn. — AURI, along with many other state initiatives, received a major funding reduction by the Minnesota State Legislature this session. A bill signed by Governor Tim Pawlenty in June funds AURI at $1.6 million for each of the next two years; the previous level was $3.7 million. However, AURI will remain an independent nonprofit organization, rather than merge into a state agency or be eliminated, as some earlier legislative measures proposed.

"We recognize that the legislature had a difficult task trying to balance the budget and meet the state's needs," says Edgar Olson, AURI executive director. "There remain many opportunities for us to work with rural Minnesota businesses to add value to the crops we grow. We are pleased that legislators and the governor recognized AURI's value and the need for our services and kept our organization going."

Earlier this year, the state cut AURI's funding by $887,000, which forced it to close one office in Morris, Minn. and reduce staff. Further reductions will be necessary with the additional 57 percent cut just passed by the legislature.

While reductions will be difficult, "we are still committed to carrying out our mission," Olson says. "Being independent allows us to react quickly to provide unique technical assistance and help develop ag-based products and markets that benefit rural Minnesota."

In addition to AURI's base-funding reduction, hybrid poplar research funding and the Pesticide Reductions Options program were eliminated. The hybrid poplar program supported research into fast-growing poplar trees, and the PRO program focused on research aimed at reducing petrochemical use in farm production. ■

NOTICE TO READERS

Due to budget reductions, AURI is implementing some cost-saving measures for Ag Innovation News. While we will continue to offer interesting and informative news on AURI and Minnesota's value-added industry, the means to deliver the message may change.

Beside this printed version, Ag Innovation News is available online at www.auri.org and it can be e-mailed to subscribers. Either alternative to sending Ag Innovation News in the mail helps reduce distribution costs so we can offer as much quality content as possible. We will continue to put out one of the country's best publications on value-added ventures.

If you currently receive a print copy of Ag Innovation News and are interested in receiving it electronically, please go to www.auri.org/paper. You will be prompted to answer several brief questions to ensure that you will continue receiving Ag Innovation News in the form that best suits your needs.

Thank you, readers, for helping us out.

www.auri.org/paper

AURI GUIDE TO SERVICES

A nonprofit corporation created to strengthen rural Minnesota's economy, AURI helps businesses respond to market opportunities with new and value-added uses for agricultural goods. The Institute builds working partnerships with business innovators, agricultural groups and researchers, and provides technical support to clients conducting new product research and development.

AURI programs are available to legally-organized businesses or cooperatives with projects that have the potential to create new uses or new markets for Minnesota agricultural commodities. AURI assistance is designed for the early stages of a product's life cycle, while an element of feasibility is yet to be determined. Project proposals are evaluated on the following criteria:

- Innovation/uniqueness
- Market viability
- Use of Minnesota commodities
- Number of farmer-producers impacted
- Amount of value added from further processing
- Economic impact
- Cost savings

Programs are designed to assist with:

- Identifying emerging value-added opportunities
- Developing innovative commodity-based products
- Developing production processes for feasible products
- Promoting products developed with AURI technical assistance
- Providing resources to bring new products and processes to the marketplace

Assistance may include:

- Access to AURI's scientific and business staff
- Access to laboratory and pilot plant facilities
- Product development and feasibility testing
- Process evaluation and improvement
- Technology transfer and applied research
- Business needs evaluation
- Links to available resources
- Potential for grant funds to qualifying applicants

AURI provides resources proportionate to the project's impact. Smaller-impact projects may be eligible for technical assistance only, while projects with industry-wide impact may be eligible for financial assistance.

AURI Facilities

AURI operates several laboratories:

- Pilot Plant and Product Development Kitchen, Crookston
- Coproducts Utilization Laboratory and Pilot Plant, Waseca
- Fats and Oils Laboratory, Marshall
- Meat Laboratory, Marshall

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QUICK FACT: After four years of selling bulk premium compost, Mississippi Topsoils added one-cubic-foot bags last year and has already sold 10,000.

Compost sales heat up

… and Mississippi Topsoils is named AURI "Ag Innovator of the Year"

BY DAN LEMKE

Cold Spring, Minn. — Like any cook, Brad Matuska knows the secret to great cooking is quality ingredients — even if the final product isn't edible.

As co-owner of Mississippi Topsoils, Matuska has perfected the recipe for cooking up premium compost. His raw materials — wood chips and poultry processing solids from the Gold 'n Plump processing plant nearby — are blended and composted in sealed metal bins. A computer system regulates compost conditions and helps control leachate and odor.

The company's innovative approach has earned it AURI's second annual "Ag Innovator of the Year" award, given to AURI clients who have achieved market success for value-added products.

"Mississippi Topsoils has perfected a process that makes a premium product from very low-value materials," says Michael Sparby, AURI project director in Crookston. "They've also adjusted to market conditions and moved from marketing a bulk product to one offered in bags direct to the consumer. I think they're a real success story."

Bulk to bags

This year is the fourth year that Mississippi Topsoils is marketing its Soil Essentials Premium Compost. Last year, Matuska began marketing the compost in one-cubic-foot bags through Minnesota garden centers. He has already moved 10,000 bags.

"Since we rolled out the bag, sales have gone up," Matuska says. "Garden centers love it and consumers love it. We started out with a few pallets here and there; now customers are asking for it by name."

A kind of school

Mississippi Topsoils may be a success story, but its achievements didn't come without a steep learning curve. Matuska holds a degree in biology and knew how to make compost. Building a value-added business from the ground up was a different story.

"I had it in theory," Matuska says, "putting it into practice took a lot more than I knew. I've learned a lot about what it takes to run a business, from taxes and employee retention to payroll and bookkeeping." Matuska credits co-owner Math Miller with bringing vital business expertise to the operation.

The learning will not stop soon; Mississippi Topsoils is working with AURI and a large Minnesota vegetable processing company to evaluate composted sweet corn silage as a soil amendment. The product is being tested this summer to see how well it supports plant growth.

The silage product could add an additional revenue stream for the ag processor. And Matuska knows working with the processor could meet a key requirement for his compost recipes: quality ingredients. "To have any predictability in our product, we have to have consistent feedstocks," he says.

"Ag processors are ideal … their products need to be consistent and predictable. So, by nature, their byproducts will be consistent as well." ■

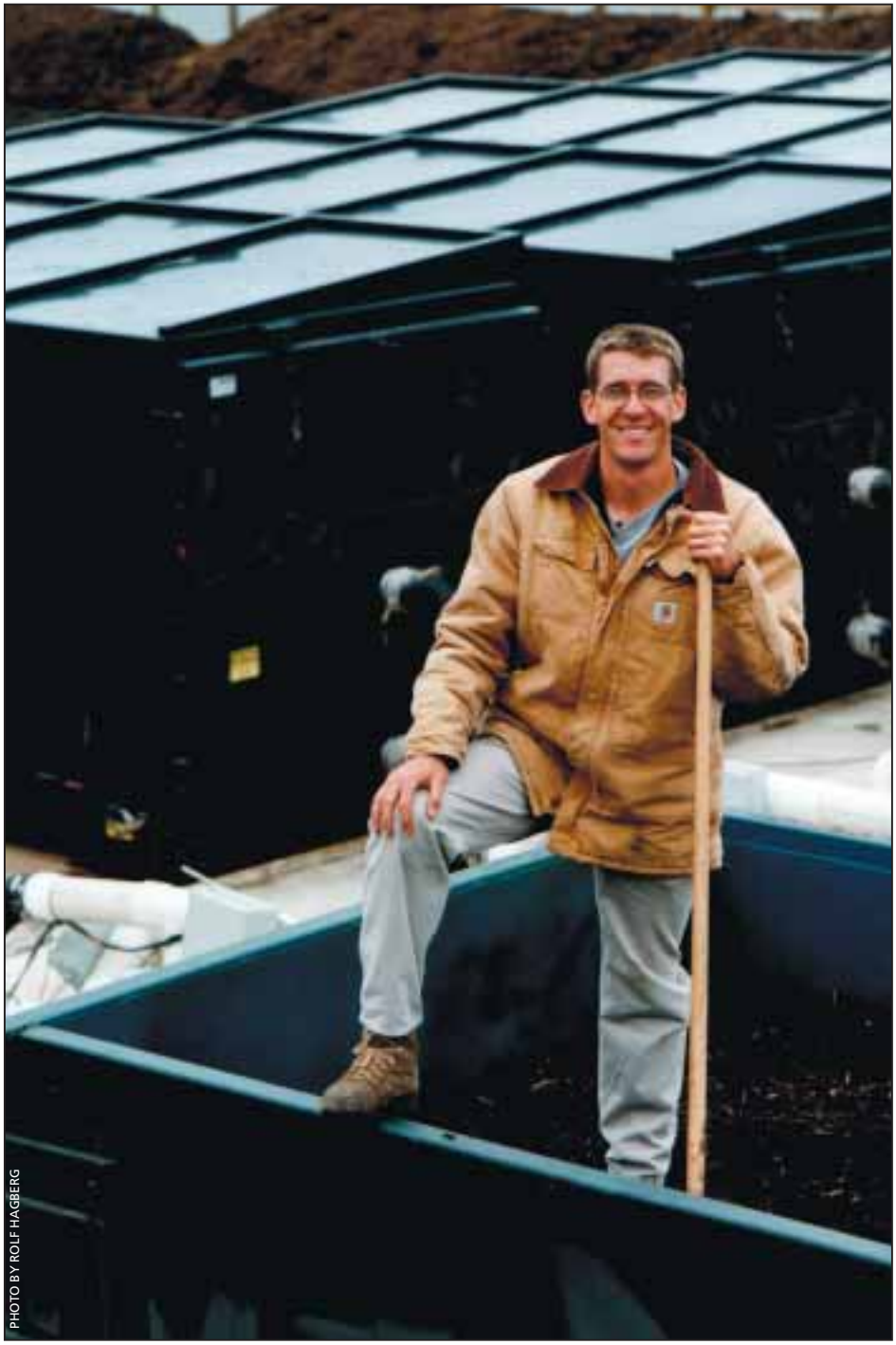


PHOTO BY ROLF HAGBERG

AURI selected Mississippi Topsoils of Coldspring, Minn., co-owned by Brad Matuska, for its annual Ag Innovator of the Year award because the company is successfully marketing a premium compost made with poultry processing waste and may soon utilize other ag byproducts such as sweet corn silage.

Mighty meat

AURI's meat program supports a healthy livestock and meat processing industry in Minnesota

PHOTO BY ROLF HAGBERG

Meat is big business in Minnesota — a $3 billion industry. Minnesota leads the country in turkey production, is number three in pork, and among the top ten in red meat production.

Most grain farmers agree that feeding their crops to livestock is one of the best ways to add value to wheat, corn or soybeans. And AURI understands that a healthy livestock industry is important to our state's economy. Not only are producers impacted, but processors, marketers, distributors and retailers.

A decade ago, AURI demonstrated its commitment to the Minnesota meat industry by constructing a meat product development lab in Marshall, led by scientist Darrell Bartholomew and a staff of experts. AURI's meat program has since helped hundreds of businesses develop and test production of new meat and poultry products — from pet treats to buffalo brats. AURI supports the development of new food safety technologies and such processes as the rinse and chill technique featured below, which increases the value of lower-quality cuts. The institute also offers food safety and processor training instruction to Minnesota businesses.

In this special section of Ag Innovation News, we highlight just a few of the ways AURI is helping to add value to Minnesota's important livestock industry.

Wash the beef

AURI tests confirm that a rinse and chill method delivers tender, safer meat

BY E. M. MORRISON

St. Paul, Minn. — A patented rinse and chill technology reduces harmful bacteria in ground beef, according to tests sponsored by AURI and the Minnesota Beef Council. The process, commercialized by Meat Processing Services Corporation, cleans and cools beef carcasses by flushing the circulatory system with a cold solution of water, sugar and salt.

Two years ago, AURI tests using Angus beef found that rinse and chill reduces coliform contamination, lowers cholesterol, and improves meat tenderness, color and shelf life. Those findings have now been confirmed by a second, larger set of trials, performed last fall at AURI's Marshall meat lab and the University of Minnesota.

The real hamburger helper

Rinse and chill gives packers an important tool for improving meat safety and quality, says Darrell Bartholomew, director of AURI's animal products program, which has worked with MPSC since 1994. "There are a lot of benefits from this technology."

The recent trials were conducted on 40 Wulf Limousin cattle, which produce very lean meat. The cattle were slaughtered at G & C Packing in Colorado Springs, Colo., which is already using the rinse and chill process. Microbial testing of the meat samples showed that rinse and chill consistently inhibited the growth of coliform bacteria in vacuum- and tray-packed ground beef, Bartholomew says. Salmonella and harmful *E. coli 0157:H7* were also reduced. The protective effect of the technology extended to a 50-50 blend of rinse and chill ground beef and control samples. Livers from rinsed and chilled carcasses were also lower in harmful microbes.

"We expect the same effect in the whole carcass: less spoilage bacteria, coliform and *E. coli,*" Bartholomew says. In addition, rinse and chill lowered cholesterol in muscle tissue and livers, the tests found.

Good looks and taste

Rinse and chill beef was also evaluated for taste, tenderness and shelf life by panels of experts organized by AURI meat technologist Brian Reuter. One panel looked at shelf-life factors, including color and purchase appeal. The panel compared rinse and chill loin and chuck steaks with a control group. Rinse and chill chuck steaks rated higher than the control steaks on all desirable criteria, Reuter says, gaining two days of visual shelf life.

Trained taste-testers evaluated the cooked meats for tenderness and flavor. They said chuck steaks from the rinse and chill group were more tender than the control group. Their subjective evaluation was backed by an industry test for tenderness, measuring the mechanical force needed to cut through meat, which showed rinse and chill strip steaks to be more tender than control steaks. The taste panel also compared samples of cooked liver. The rinse and chill liver was judged to be milder in flavor.

These test results underscore the quality benefits of rinse and chill. "It's an opportunity to improve meat tenderness, which tends to be quite variable and is a problem for the meat industry," Bartholomew says. Even more important, he notes, are the safety benefits. Bacterial contamination, especially in ground beef, is a major industry concern.

Because the bad *E. coli* "is more prevalent than previously thought, plants are reevaluating their food safety plans. Rinse and chill offers one more tool to control pathogens, and it brings other benefits as well." ■

Pass the buffalo

A Fergus Falls entrepreneur retires to the bison business

BY E. M. MORRISON

Fergus Falls, Minn. — Dennis Tuel, Sr., has started nine successful companies in the last 40 years, including ShoreMaster, a $22-million maker of waterfront equipment. Now in his "retirement," Tuel, 67, has turned a bison hobby into a leading business.

Tuel and his daughter and son-in-law, Tricia and Mike Vetrone, operate Buffalo Pass Ranch, with 550 bison north of Fergus Falls. The family's wholesale marketing company, Buffalo Meat, Inc., distributes frozen bison to retail stores in the Upper Midwest. And this summer, the company launched its own branded meats.

AURI's meat lab in Marshall helped Tuel develop and test nearly two dozen buffalo products for the new label, including bratwurst, franks, Polish sausage, breakfast patties, summer sausage and five varieties of jerky. AURI also helped Tuel develop buffalo ham and bacon plus two cooked offerings: buffalo chili and stew. The Buffalo Pass Ranch line also includes steaks, roasts and ground burger — the top seller.

Set up the freezers yourself

Tuel's company operates two delivery trucks, distributing frozen products directly to nearly 200 supermarkets in Minnesota, the Dakotas, Wisconsin and Illinois, including Cub Foods, Coborn's and Cashwise stores. The bison meat is displayed in free-standing, 12-cubic-foot freezers supplied by Buffalo Pass Ranch.

The freezers, which provide prime shelf space and high visibility, have been effective in getting the new products into stores and in generating sales, Tuel says. "The buffalo doesn't get lost with the beef and pork and other meats."

Buffalo Pass Ranch, which employs three salesmen, is promoting its brand through in-store demos and free meat counter samples: "In the past we've done three demos a year in each store — very expensive," Tuel says. The company also runs coupons and special promotions. "And, of course, anybody in the meat department gets the full court press on buffalo meat."

A kind of hobbyhorse

Tuel grew up on a dairy farm in Douglas County and says, "I couldn't wait to get out of there." After earning degrees in biology and chemistry, he sold pharmaceuticals and worked as a commercial pilot. He owned an airplane dealership in Florida for several years, then returned to Minnesota to found ShoreMaster in 1972, manufacturing the first all-aluminum boat lifts, as well as docks and floating marinas.

In 1994, Tuel retired from day-to-day management of ShoreMaster; he sold the company in 2002.

A longtime wildlife enthusiast, Tuel had purchased three buffalo cows and a bull in 1990 — just for fun, he says. Feeling bored with retirement, "I went out and bought some more registered animals," investing thousands of dollars in top bulls.

By the end of the decade, Tuel and his daughter and son-in-law had built a breeding herd of 550. They grow 400 acres of hay for feed and have produced many award-winning bulls and heifers. Buffalo Pass Ranch was named Minnesota Buffalo Association Producer of the Year in 2001 and 2002.

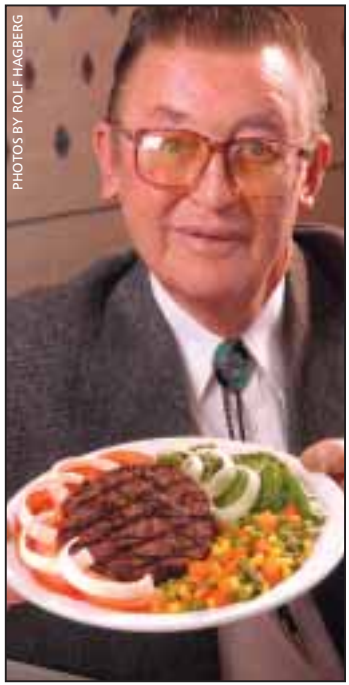
Moving to meat

As the Midwest bison industry matured in the late 1990s, Buffalo Pass Ranch's marketing focus gradually shifted from genetics to meat. The ranch had been selling some meat all along, mainly to another Tuel-family enterprise, the Big Chief Truck Stop in Fergus Falls. The busy restaurant offers a variety of buffalo dishes and the convenience store sells frozen meat. Little by little, Tuel began supplying other meat outlets, too.

"We started small, with 10 or 12, and kept expanding until finally I said, 'Let's go for it.' " He established Buffalo Meat, Inc. in 2002. Initially, the wholesale company distributed Buffalo Nickel brand meats, produced by a North Dakota-based bison co-op.

Last fall, Tuel began working with AURI scientists Darrell Bartholomew, Brian Reuter and Charan Wadhawan on his own private label. "We helped him standardize the recipes and scale up for commercial batches," Wadhawan says. "We also did nutritional analysis and labeling." All the Buffalo Pass Ranch products were taste tested at the Big Chief restaurant and are processed at USDA-inspected plants.

PHOTOS BY ROLF HAGBERG



After 40 years of success in business, Dennis Tuel, Sr. started raising bison in 1990 as a retirement hobby. He now raises 550 bison, with his daughter and son-in-law, and recently launched a new line of sausages, stews and chili along with his popular ground burger.

Bright bison future

Tuel, a past president of the Minnesota Buffalo Association, says the outlook for the bison industry is bright. There are now more than 10,000 bison on Minnesota farms; two-thirds of the state's producers are direct-marketing meat. "That's good," Tuel says. These entrepreneurs are helping to build demand for the alternative red meat, which is low in fat and calories.

Minnesota bison farmers raise a high quality, consistent product, Tuel says. Buffalo Pass Ranch meats are produced by growers following a standardized feeding regimen, "so if you buy a pound of burger in Morris and a pound of burger in the Twin Cities, they will be uniform," Tuel says.

Consumer prices for buffalo meat are also dropping, making bison more competitive with beef, says Bartholomew, who oversees the AURI animal products program. The bison industry is also doing a better job of marketing the whole carcass, "not just premium cuts," he says. "Price and selling the whole carcass are two of the industry's biggest hurdles."

Meanwhile, Tuel expects his former hobby to post strong sales this year, though he doesn't disclose numbers. And what about retirement? He shrugs: "Once an entrepreneur, always an entrepreneur." Besides, he says, looking out the window of his home at the herd of bison dotting the hillside, "I kind of like these buffalo." ■

For more information about Buffalo Pass Ranch, visit www.buffalopassranch.com

AURI at work

Services provided to Buffalo Pass Ranch include:

- Meat product development and testing
- Scale-up for commercial production
- Nutritional analysis and package labeling

By special request

When customers asked for new lamb products, two Minnesota growers turned to AURI for help.

STORIES BY E. M. MORRISON

PHOTOS BY ROLF HAGBERG

Sausage sans nitrites

When Twin Cities food co-ops asked Country Meadow Farms for lamb sausages with no nitrites, the central Minnesota lamb cooperative obliged.

Country Meadow Farms, a marketing group formed in 2000 with help from AURI, supplies lamb year-round to Metro-area natural foods stores, including Mississippi Markets in St. Paul, Fresh and Natural Foods in Arden Hills, and Linden Hills Co-op in Minneapolis.

The five co-op members raise Montadale sheep, producing about 1,000 lambs a year. Country Meadow Farms directly markets roughly a third of the group's lamb crop, says member Chuck Christians of New Brighton, a retired University of Minnesota scientist who organizes processing and distribution. The co-op is also collecting carcass data on the Montadale breed as part of the sheep industry's effort to improve quality.

Hard to compete

Country Meadow has struggled to be price-competitive with its fresh and frozen lamb cuts, Christians says. Low volume, high processing costs and cheap imported lamb have weighed on the co-op's profitability. "That's why we're looking at more processed products."

The co-op's best seller has been lamb summer sausage, Christians says. Initially, Country Meadow Farms sausage contained sodium nitrite, a widely used meat preservative. But growing demand for naturally processed foods led natural foods stores to ask the co-op for no-nitrite-added sausage.

Scientists at AURI's meat lab in Marshall helped the group develop and test no-nitrite-added summer sausage in two flavors, regular and garlic, as well as lamb franks, brats and sandwich meat. In taste tests, the specialty meats got a good response, Christians says. "Consumers liked the flavor, the eye appeal, the color."

Country Meadow Farms' reformulated summer sausages will be introduced later this summer. "As far as we know, there is no other no-nitrite-added lamb sausage on the market," Christians says. "We're hoping this will give us a niche." ■

AURI at work

Services provided to Country Meadow Farms include:

- Recipe development and testing
- Nutrition analysis and labeling

Flavor of the Mediterranean

Lamb producer set to market gyros meat

Hutchinson, Minn. — When her customers kept asking for gyros meat, Hutchinson lamb producer Connie Karstens decided it was time to go Greek. She already knew Minnesotans love the Mediterranean blend of ground lamb, beef and spices served on pita bread. Since 1991, she's been serving gyros (pronounced YEE-ro if you want to sound Greek) at her Minnesota State Fair food booth, where she sells about 2,000 pounds of the meat mixture in two weeks.

"There's a demand for this product," but little available for the home kitchen, she says. "So we said, we might as well try to fill the demand." Karstens, 42, and her husband, Doug Rathke, 43, own a 250-ewe sheep farm, "Liberty Land & Livestock" in Meeker County. In addition to their popular State Fair booth, they operate an on-farm meat processing plant and a retail store, The Lamb Shoppe, where they sell fresh and frozen lamb cuts. Gyros is the latest addition to their product line.

Most commercial gyros mixtures are mainly beef, with just a little bit of lamb, according to Karstens. "We want to make one with more lamb. That will set us apart. We're also using Minnesota-grown meat. A lot of my customers are asking for gyros meat made locally."

Karstens worked with the AURI meat lab in Marshall to develop and test gyros recipes and processing methods. AURI's Charon Wadhawan provided nutrition analysis and labeling for the new gyros meat, which will be available for retail later this year. AURI also helped Karstens find a co-packer.

Sheep producers Connie Karstens and Doug Rathke operate a USDA-inspected processing plant and The Lambe Shoppe retail store on their Meeker County farm.

On the cover: Kata Karstens enjoys a wrap filled with gyro meat — her parents' latest addition to their Liberty Lamb line.

More from each lamb

This is the second time AURI has worked with Karstens and Rathke. In 1996, AURI supported the building of a USDA-inspected farmstead meat-cutting plant and sponsored advanced lamb-cutting instruction from the British Livestock and Meat Commission.

Karstens and Rathke, in business since 1986, have built a profitable operation by keeping production and processing costs low and directly marketing everything they grow. They graze their Dorsets from April to December and lamb in February, May and October, producing about 500 market lambs a year. They slaughter weekly at nearby Carlson Meats in Grove City, then do their own cutting and packaging.

"We vary our product selection by season, based on our experience of what people want," Karstens says. To offset processing costs, she sells the whole carcass: fat to artisan soap makers, tongues and kidneys to local ethnic markets, bones and other cuts to pet owners. "You have to sell everything."

Karstens and Rathke directly market more than 1,000 lambs a year, outstripping their own farm's production. "It's really taken off," she says. They fill out orders with lambs from a dozen area growers who use their genetics and feeding regimen, which assures uniform quality for their product.

Karstens, who handles all the marketing, delivers fresh lamb to two ethnic restaurants in the Twin Cities. The rest she sells frozen at The Lamb Shoppe, located an hour west of Minneapolis on Highway 7.

Farm mystique

Karstens also sells beef, free-range poultry, fresh eggs, butter, cheese, organic flour, woolen goods, herbs and seasonal produce. She promotes the popular mystique of the family farm: "We're selling a whole atmosphere here, a whole experience."

Lamb Shoppe customers can pick their own eggs, watch Lilly the llama and Ace the dog herd sheep, check out the donkeys that guard the flock, visit the baby lambs, or even see a sheep shearing (Doug Rathke is an international sheep shearing champion). "We try to appeal to all the senses."

Karstens, who gets about 30 drop-ins a week without advertising, says consumers are eager to connect personally with the people who grow their food. "That's the fun of it and the really rewarding part: when people from the city say, 'That's my farmer!' " ■

For more information about The Lamb Shoppe, and a virtual tour of the farm, visit www.ourfarmtoyou.com

AURI at work

Services provided to The Lamb Shoppe include:

- Recipe development and testing
- Co-packer identification
- Nutrition analysis and labeling

PHOTO BCOURTESY OF R & P GORMET BEEF

Piedmontese cattle, brought to the United States from Italy about two decades ago, yield a lean, tender beef used in R & P Smokey Meat Sticks, made in Marshall, Minn.

Stick 'em up

AURI helps beef producer design lean beef sticks

BY E. M. MORRISON

Marshall, Minn. — Randy Brandt's seasoned beef sticks aren't just slim, they're lean. R & P Smoky Meat Sticks are made of Piedmontese crossbred beef — an extremely lean breed from northern Italy.

Brandt, 46, is one of about a dozen Minnesota cattlemen raising the Piedmontese crossbreed, and he has been direct marketing the meat since 1999, when an AURI-sponsored meat class sparked an interest. This spring, again with AURI's help, he began selling his own brand of lean beef sticks, franks and other specialty meats.

Brandt started raising Piedmontese cattle in 1994. A third-generation farmer, he grew up on a dairy farm and followed his father into the business, milking cows for 17 years. In 1998, after a number of setbacks, he switched from dairy to beef cattle. He feeds out 100 head a year and direct markets under his own label, R & P Gourmet Beef.

A breed apart

Selling directly to customers allows Brandt to promote Piedmontese traits, he says. The breed, introduced in this country about 20 years ago, produces "the lean but tender beef American consumers want." Piedmontese cattle are heavily muscled with little marbling. Yet the muscle fibers are finer than those of other Continental breeds, he says, making the meat unusually tender.

These distinctive traits have helped Brandt win 15 retail meat accounts in southwest Minnesota. He works with Cannon Falls processor Lorentz Meats and distributes the products himself in a second-hand freezer truck. Brandt also sells frozen beef directly to consumers at farmers markets in St. Paul, Sioux Falls and Sioux Valley and over his Web site.

Seven on the way home

Several months ago, Brandt came to AURI for help in developing his Smoky Meat Sticks, now one of his best-selling products. The extra-lean Piedmontese sticks leave "no aftertaste or greasy film on the roof of the mouth afterwards," he says. "The first time I tasted them, I thought, 'These are fabulous.' I ate seven of them on the way home." AURI also helped Brandt develop and test recipes for brats and franks and a ground beef and bacon mixture requested by one of his restaurant accounts.

For now, R & P Gourmet Beef is a one-man operation. Brandt hopes to grow the company enough to bring his two sons into the business — if they want careers in agriculture. "There's lots of competition," he acknowledges, "but I distinguish my products by taste and quality." ■

For more information about R & P Gourmet Beef and Piedmontese cattle, visit www.gourmetbeefinc.com

AURI at work

Services provided to R & P Gourmet Beef include:

- Recipe development and testing
- Nutritional analysis and labels

Another 'link' in the line

Papa George adds three sausage flavors to his specialty meats

BY E.M. MORRISON

Stillwater, Minn — George Ghanem has been marketing ethnic and gourmet meats to Midwest consumers for 10 years. His food company, Papa George, now makes nine products, including pork sausage, gyros, ground lamb and cucumber sauce. Last December, Papa George added pork sausage links in three flavors: original, Italian and maple.

AURI's meat lab in Marshall has worked with Papa George on several new products since 1993. "I have a great love for spices and herbs," says Ghanem who adds he wants to offer his customers tasty, healthy, affordable food products with no added preservatives. Ghanem spent several months testing and revising his new sausage links. "Even after people said they liked them, we didn't think the taste was optimal," he says. "We went through months of refinement and improvement."

The sausage links, like all Papa George's products, have no MSG, no preservatives and no fillers. "That's one way we distinguish ourselves from other brands." The links are juicy but lean, containing 55 percent less fat than regular pork sausage, Ghanem says.

All Papa George's meats are processed in Minnesota and Wisconsin and packaged in gold and red wrappers with a distinctive Mediterranean galley logo. The product line is distributed by Super Valu and sells in grocery stores in Minnesota, Wisconsin, Iowa, the Dakotas and Illinois.

Ghanem, soft-spoken and genial, spends much of his time on sales. He logs hundreds of hours a year cooking sausages at supermarket meat counters, giving away samples and talking to consumers. "I do a lot of store demos, several a week," a cost-effective way to advertise new products, Ghanem says.

Ghanem loves to cook and is working on more new products, including some vegetarian items. A physicist by training, he uses a scientific approach to business development. But, he adds, "If I had known 10 years ago what I know now, I might not have tried it."

Still, there is nothing more satisfying than giving people good things to eat, Ghanem says. His philosophy: "If you have something good, let everyone enjoy it. The food business is hard, but it's not impossible." ■

For more information about Papa George's products, visit www.papageorges.com

AURI at work

Services provided to Papa George include:

- Product development and testing
- Nutritional analysis and labeling

PHOTO BY ROLF HAGBERG

Over the past 10 years, AURI meat scientist Darrell Bartholomew, at left, has helped "Papa George" Ghanem design several specialty sausages at AURI's meat lab in Marshall, Minn.

QUICK QUOTE: " In the end, if you have one or two (commercial varieties), you feel pretty good." — *Jim Orf*

Grown to taste

Researchers test soybeans for Minnesota climates and Asian palates

BY GREG BOOTH

The tastiest tofu in Taiwan could soon be coming from Minnesota.

Soybean varieties developed from Japanese and Chinese stock and adapted to grow in Minnesota are finding their way to the export market. AURI is supporting lab and field tests of new food-grade varieties to help put more Minnesota beans on the export track, says Keith Sannes, deputy director of commercial development.

Researchers at the University of Minnesota and North Dakota State University are examining plant yield and disease resistance to determine the best growing traits for Minnesota. They are also studying soy varieties to find the best qualities for tofu, soy milk and other products for Asian markets, says Jim Orf, U of M professor of agronomy and plant genetics.

For several years, Orf and other researchers have crossed soybeans from Japan and China with U.S. varieties, trying to blend the characteristics desirable for food — flavor and protein — with traits such as high yield, adaptability and disease resistance.

Soy big biz

Soybeans and soy products make up the largest portion — 33 percent — of Minnesota's agricultural exports, according to the Minnesota Trade Office. Minnesota is the fourth-largest soybean producing state, exporting $727.6 million worth of soybeans and products in 2000. Most are produced for animal feed and oil; food-grade soybeans comprise a small part of the market and are often grown on plots of 5 to 40 acres — but they sell for a higher price.

With AURI's support, Orf is growing more than 40 lines of food-grade soybeans for testing by Sam Chang, professor of cereals and food science at NDSU.

Tofu tests

From Orf's samples, Chang and his assistant take a few pounds of beans, soak them, grind them and separate the soybean residue from the milk. After the soy milk has cooked for 10 minutes, a coagulant is added and the milk is transferred to a mold and pressed with weights for 30 minutes. Cooled and removed from the mold, the tofu is analyzed for chemical content and sensory qualities.

A self-professed tofu connoisseur, Chang looks at processing yield — grams of final product per 100 grams of soybeans — color, protein content and texture. He never tires of taste-testing the end results. "We grew up with it. I think tofu is a health food. … We conducted research to show tofu has antioxidant characteristics."

Machines can do some of the analytical work, Chang says, "but people can judge if the texture is smooth or not. For good tofu, smoothness and firmness are desirable, but not too soft, not too firm."

PHOTO BY ROLF HAGBERG

To meet Asian markets' growing demand for soybeans to make tofu and other soy products, AURI is looking into new food-grade varieties that can be grown in Minnesota for export.

A test of time

Following an initial plant breeding, Orf says, several years of inbreeding and yield testing are needed to develop a commercial soybean variety. "You weed down from thousands of lines to 20 to 40, then three to four that companies may be interested in. In the end, if you have one or two, you feel pretty good." With yield testing, growing several generations might take up to nine years.

A few varieties are now available for Minnesota growers, Orf says, including Proto and Toyopro. "Some are adapted to northern Minnesota, and some to southern Minnesota. There's a 100-mile band across the state where (a given variety) is best adapted."

Processors and marketers want to know which varieties will make the most attractive exports, Sannes says. The tests done by Orf and Chang will help processors "know which varieties make good tofu," Sannes says. "Some might yield differently — quality and yield are variety-dependent." Processors can then contract with growers for specific varieties.

"(Food-grade) soy commands a premium," Chang says. "Oilseeds do not generate a lot of income. … The potential for the farmers or traders to market a more valuable crop is high."

Chang adds that his lab does soybean analysis for individual growers or groups. "With the health benefits of soybeans, it's very meaningful research."

The effect of storage

Chang has also studied how storage affects soybean quality. He calls the results "very important" for growers who store beans on the farm. In Minnesota's heat and humidity, Chang says, soybean quality can be reduced. Tangible effects include reduced solubility and flavor, lower product yield, and overall deterioration in tofu quality.

Information from the soybean trials is being shared with the Minnesota Department of Trade and Economic Development, Minnesota Soybean Growers Association, Minnesota Soybean Research and Promotion Council and the Minnesota Department of Agriculture, Sannes says. The Minnesota Crop Improvement Association will license the new varieties. Depending on demand, varieties may be licensed to one or two seed companies, to a half-dozen companies, or to any company as a general release. ■

Want to know more?

For information about food-grade soybeans in Minnesota, contact the following:

Seed directory
Minnesota Crop Improvement Association, 800-510-6242, www.mncia.org

Performance data
University of Minnesota, www.soybeans.umn.edu

Food analysis
Sam Chang, NDSU, (701) 231-7485, kow.chang@ndsu.nodak.edu

All aspects
Minnesota Soybean Growers Association and the Minnesota Soybean Research and Promotion Council, www.mnsoybean.org

Midwest states champion value-added agriculture

BY LISA GJERSVIK AND DAN LEMKE

Midwest states with significant agricultural industries have recognized the role value-added agriculture plays in keeping a state economy strong. Advancing new opportunities for producers and opening new markets for commodities is a key to economic sustainability.

Naturally, states do not all take the same approach to value-added opportunities. Several have grant programs; others offer technical assistance. Some help through their state university systems or state departments of agriculture; others have independent organizations. In the Midwest, AURI is unique in its mixture of programs and technical assistance.

Regardless of structure, these efforts promote value-added agriculture and the rural economy. Following is a brief overview of programs from other Midwest states.

North Dakota

Agricultural Products Utilization Commission

MISSION

To create new wealth and jobs through developing new and expanded uses of North Dakota agricultural products.

FUNDS

State of North Dakota.

SERVICES

APUC awards grants for basic and applied research, marketing and utilization, farm diversification and prototype development programs.

PROJECT EXAMPLES

The APUC commission meets quarterly to award funds for value-added projects.

In February of 2003, the APUC funded 10 projects for a total of nearly $430,000. Among the projects are a security fence for North Dakota State University's industrial hemp-growing studies, the development of a seed potato farm, and the marketing of whole peeled onions.

South Dakota

Value-Added Agriculture Development Center

MISSION

To foster the creation of producer-owned, value-added agriculture by offering technical and staff support and championing value-added agriculture by educating producers, lenders and the public.

FUNDS

18 producer-based commodity groups, trade organizations and cooperatives.

SERVICES

Project facilitation, feasibility studies, business planning, market assessments, technical assistance, capital drives, loan packaging and education.

PROJECT EXAMPLE

VAADC participated in a producer meeting in the fall of 1999 to test interest in the construction of a 40-million-gallon ethanol plant in the Milbank area. VAADC helped guide the project through preliminary development. When it became evident the project was feasible, VAADC handed it to a full-time project manager and construction firm. The capital drive was successful and construction is expected to begin this summer.

Value Added Finance Authority

MISSION

To develop and promote agricultural processing in South Dakota. One of the authority's programs, the Value Added Agribusiness Relending Program, loans businesses up to $250,000 for processing or marketing agricultural commodities.

FUNDS

State of South Dakota (through the Department of Agriculture).

Iowa

Center for Crops Utilization Research

MISSION

To improve American agricultural competitiveness by improving understanding of the basic properties of crops and their components and using that information to develop new food, feed and industrial products.

FUNDS

State of Iowa (through Iowa State University).

SERVICES

This is a research, development and technology transfer program focusing on new processes, products and markets for ag commodities. Research is conducted on emerging ag-based products, such as degradable plastics, industrial adhesives and novel construction materials.

PROJECT EXAMPLES

CCUR has conducted substantial research into producing rubber, adhesives and plastic materials from polymerized corn and soybean oils. Research has also been conducted into protein isolation and purification for enhanced food products. CCUR utilizes a $15 million state-of-the-art lab that includes a processing and training facility for wet processing, dry processing, fermentation, biocomposites, industrial product development and consumer and sensory testing.

Iowa State University Extension Service

MISSION

To educate the public about new opportunities in value-added agriculture.

FUNDS

State of Iowa (through Iowa State University).

SERVICES

Marketing and business plans, technology transfer and business assistance.

PROJECT EXAMPLES

Extension Service projects include work on a dry edible bean cooperative and assistance for organic fruit production including grapes, apples and blueberries.

Wisconsin

Wisconsin Department of Agriculture, Trade and Consumer Protection

MISSION

To develop high-value industrial crops for nutraceutical and pharmaceutical uses, along with ethanol and fiber crop production, and cultivate improvement in the economic well-being of farmers and rural communities.

FUNDS

State of Wisconsin.

SERVICES

Agricultural Development and Diversification grant program, alternative fuel development, aquaculture, direct marketing, new uses, organic agriculture, "Something Special from Wisconsin" brand identity program.

PROJECT EXAMPLES

ADD grants have supported efforts to market cheese from grass-based dairies, studies to improve chicken egg production, and evaluations of dairy manure in potato production.

Cooperative Development Services

MISSION

To work with crop and livestock producers to add value to their products through cooperative value-added processing, to identify market niches and opportunities in a changing marketplace, and to provide expertise in conventional, sustainable and organic agriculture.

FUNDS

Fees for services.

SERVICES

Market research, feasibility analysis, business planning, funding procurement.

PROJECT EXAMPLE

In early 2002, CDS completed a comprehensive market study of the organic dairy industry for a dairy farmer group. Through interviews with industry leaders and secondary research, CDS produced a detailed report and developed a set of recommendations for a value-added organic dairy enterprise.

Nebraska

University of Nebraska Food Processing Center

MISSION

To assist food manufacturers with product and process development. The Center offers a range of business development capabilities in market research, product costing, ingredient sourcing, market testing and business venture development.

FUNDS

State of Nebraska (through the University of Nebraska).

SERVICES

Pilot plants — extrusion, meat processing, dehydration, packaging, spray drying; laboratory services — comprehensive product development, microbiological services, analytical services, shelf-life and sensory evaluations; marketing services — product costing, customer processing, packaging and ingredient sourcing, market testing, business plan development, product line extension.

PROJECT EXAMPLE

The Food Processing Center worked with the Southeast Iowa Nut Growers Cooperative to identify value-added chestnut products for the foodservice industry. Assistance was provided with processing chestnuts for a test market in upscale restaurants. As a result, the cooperative identified a niche market opportunity for chestnut products.

Kansas

Agriculture Value Added Center

MISSION

To provide technical and financial support for the creation and expansion of producer-based alliances and value-added businesses. AVAC pursues this objective through a foods and feeds program, an industrial agriculture program and a cooperative development program.

FUNDS

State of Kansas.

SERVICES

AVAC funds provides loans and services to value-added projects for processing and marketing. AVAC assists individual producers, cooperatives and other business structures as well as rural communities.

PROJECT EXAMPLE

In December of 1997, soybean producers from Washington County met to identify ways to add value to their crops. In April of 1998, the producers formed North Central Kansas Processors to finance a soybean crush plant. A year later NCKP leveraged several loans with producer equity and raised $1 million for building the plant, which began operating in July 1999.

Missouri

Ag Innovation Center, Missouri Department of Agriculture

MISSION

To be a resource and assistance center for Missouri's agricultural producers by providing business counseling, training and resources for start-up and expanding agricultural businesses, with a primary emphasis on value-added agriculture.

FUNDS

State of Missouri.

SERVICES

Assistance in identifying and assessing market opportunities, writing business plans, facilitating projects in the start-up phase, designing new or expanded organizational structures, assessing capitalization strategies, identifying financial assistance opportunities.

Missouri Value-added Development Center

MISSION

To (1) provide extension educators with decision support tools with which to assist agriculture producers in the formation and operation of collective businesses, (2) develop a mechanism for linking campus research and extension activities related to value-added agriculture, and (3) provide support and strategic planning input to functional business units.

FUNDS

State of Missouri (through the University of Missouri).

SERVICES

The Center is home to the University of Missouri Outreach and Extension Agricultural Business Counselors, with 41 professionals trained in business development and leadership skills. The ABCs serve three primary roles: initial contact, information source and value-added educator.

PROJECT EXAMPLE

One Missouri farmer switched from a hog operation to carve out a niche raising and selling varieties of freshwater fish. Some of the fish are sold to restock lakes and rivers, others are for food markets. The producer is now able to set the price he needs rather than simply take the price he's given.

Advancing new opportunities for producers and opening new markets for commodities is a key to economic sustainability.

QUICK FACT: Amaranth is the best plant source of squalene, a powerful antioxidant used in supplements by some people with diabetes, hypertension or metabolic disorders.

Bushels of promise

STUDY EXAMINES THE PRODUCTION AND MARKET POTENTIAL OF 11 GRAINS

PHOTO BY ROLF HAGBERG

Charan Wadhawan, AURI cereal scientist, initiated a production and marketing study of 11 grains that could be grown in Minnesota. The report identifies special traits that may be targeted to nutraceutical, functional food and industrial markets.

BY CINDY GREEN

The hottest value-added opportunities emerging today may come in the tiniest packages.

Little seeds from the cuphea plant, for example, encapsulate valuable oils that give candy coatings a smooth texture and improve the flavor of chewing gum. Beta glucans extracted from oat and barley hulls may boost the immune system and lower cholesterol. Silky starch granules extracted from amaranth may replace fat as well as boost the protein and antioxidants in cookies and crackers.

Grain components such as these could potentially bring millions of dollars into Minnesota's agricultural economy, according to Charan Wadhawan, AURI cereal scientist.

In November, Wadhawan launched a survey of 11 grains that are or could be grown in Minnesota. All have components suitable for "functional foods" — regular food products with medicinal ingredients — or nutraceuticals in capsule, concentrate or other supplement forms.

"Consumers are choosing more food products that have health benefits. The market is increasing every year," says Wadhawan.

The study, completed in May by food nutrition scientist Triveni Shukla of the Food, Research and Innovation Enterprises in Wisconsin, includes extensive information on each grain — including global production, markets, functional traits, production and processing issues, new developments and opportunities.

"We wanted to get a grasp on the latest and greatest — to see what's out there in the public domain and gather it under one document," says Michael Sparby, AURI project director. The study did not include the functional traits of corn and soybeans "because we felt there was so much available already that we could tap into."

AURI's next step, Wadhawan says, is to set priorities with the help of farmers, processors and sellers who will be invited to a presentation of the study's findings this summer.

After determining the best opportunities, "we'll see what is needed," Wadhawan says. It might be breeding to increase a crop's concentration of a high-value component. Or if a variety already has a high concentration of value, "we'll focus on developing products."

Wadhawan says AURI will identify producer-owned co-ops and companies interested in carrying out projects in "functional" foods markets.

Some of the grains surveyed are familiar Minnesota crops — spring wheat, barley, oats, wild rice, dry edible beans and sunflowers. Others have only a small presence — amaranth, buckwheat, flax, canola and cuphea, which is not yet grown commercially in the United States.

Below are summaries of the uncommon grains surveyed. The next Ag Innovation News issue will explore unusual traits of common Minnesota grains.

Amaranth

PIGWEED KIN HIGH IN PROTEIN

A close relative of pigweed, amaranth has been valued since ancient times for its nutritional and ornamental qualities. This hardy broad-leaf plant is easy to grow, a prolific grain producer, and suitable for areas with dry conditions and killing frosts.

One of the highest-protein grains, with numerous medicinal attributes, amaranth has excellent potential in health food and nutraceutical markets. Amaranth's sweet, nutty flavor complements a range of cereal products, and its starch could replace fat in processed foods.

Although a profitable crop, expanding production could quickly drop amaranth prices, so farmers may wish to contract their acreage with one of three major companies that buy the grain.

Production notes

Amaranth is planted in late May to mid-June. The plant grows slowly until it reaches a foot high, then it grows rapidly and forms a canopy. Amaranth is a low-maintenance crop and can tolerate dry conditions, as it draws moisture from four to five feet below ground.

Because the stems and leaves hold moisture until the plant is killed by frost, amaranth must be harvested at least 10 days after a killing frost in dry weather. Traditional harvesting equipment can be modified to harvest the grain.

Production costs are relatively low, so net returns currently average about $223 per acre. However, an additional several hundred acres of production could cause a surplus and lowered prices. Amaranth's market is limited and only a few U.S. plants process it, so most growers will also face high transportation costs.

Amaranth is common in Peru, Bolivia and Mexico, but the largest producer is China, yielding 192 million pounds per year. In the United States, about 6,000 acres have been planted in Great Plains and Midwest states — primarily the cruentus variety, which grows to seven feet. Production trials in North Dakota show yields as high as 1300 pounds per acre, but 700 to 800 pounds is typical.

Functional values

Amaranth is high in protein, lysine, calcium, iron and fiber — all useful as functional ingredients in cereal products. It is also the best plant source of squalene, a powerful antioxidant used as a dietary supplement for diabetics and those suffering from hypertension and metabolic disorders.

Amaranth oil has antibacterial, anti-tumor, and burn- and wound-healing properties.

QUICK FACT: Flaxseed oil contains more omega-3 fatty acids than any other plant or fish oil.

Animal tests also show amaranth lowers blood serum cholesterol, and some varieties contain up to three percent rutin.

Since amaranth starch granules are much smaller than other cereal grains, it is being considered for custards, pastes and salad dressing. Starch polymers from amaranth may also be used as fat replacers in food products.

Areas of opportunity

Producer contracts with food companies: The three main U.S. amaranth buyers are Arrowhead Mills in Texas, Health Valley in California and Nu-World Amaranth in Illinois. Although larger companies such as Pepperidge Farm use amaranth, they purchase it from the main buyers. Amaranth is used in 40 to 50 products, but demand is low, so farmers should contract directly with a buyer before planting the crop — bypassing the middlemen.

Food products: Amaranth has a sweet, nutty flavor that can be enhanced by toasting or popping seeds before milling. Breads, cakes, cookies, pasta, tortillas and crackers with up to 20 percent amaranth flour have received favorable reviews from taste panels, in some cases scoring higher than wheat products. Health Valley, Arrowhead Mills, Inc. and Nu-World market amaranth products such as cereals and snacks.

Amaranth is also used as a major ingredient in confections and can be popped like popcorn. Its tiny starch granules could replace up to 75 percent of the fat in frozen desserts or other food products.

Nutraceuticals: Amaranth oil with tocotrienol and squalene has potential in medicinal foods.

Dye: Amaranth may also be used in specialty artisan dyes, although the market is small. Red dye from amaranth leaves is used to color food and alcoholic beverages in South America and maize dough in Mexico and the southwestern United States.

Canola
A SLIPPERY COLE CROP

Canola, an edible rapeseed of the mustard family, is grown primarily for its oil. Lowest in saturated fat of all vegetable oils, canola is high in oleic, linoleic and linolenic polyunsaturated fatty acids.

While canola's makeup is 40 percent oil, it is also 20 percent protein, yielding a high-quality meal for livestock feed. Canola varieties have been bred specifically for use in confections, as a shelf-stable cooking oil, and for the biodiesel industry.

Rapeseed has been cultivated since humankind's earliest recordings. In Europe, rapeseed has been an important food and fuel-oil source since the 13th century. Its popularity grew in World War II, when rapeseed oil was used as a marine engine lubricant because it adheres well to moist metal.

In 1979, the term "canola" was officially registered in Canada to describe "double-low" rapeseed varieties — those with less than two percent erucic acid in the oil and less than 3 mg glucosinolates per 100 grams in the meal. In 1985, the U.S. Food and Drug Administration recognized that rapeseed and canola have separate identities: rapeseed is used for industry, canola is for human consumption.

A DNA-modified canola variety high in laurate, typically found in tropical oils, was first planted commercially by Calgene in 1994. The high-laurate canola is trademarked "Laurical" and sold to the confectionery market as an alternative to cocoa butter. Calgene contracts with producers, most in North Dakota, to produce 40 to 500 acres per farm. Laurate canola yields 30 to 35 bushels per acre and sells for $6.25 per bushel.

Production notes

Worldwide canola production has reached 38 million tons annually— ranking third among all edible oils. Most is grown in China and Europe, which together produce more than 22 million tons annually.

U.S. demand for canola is rapidly increasing — even though domestic production doubled in the past seven years to 719,000 tons, consumption still outpaces production almost 3 to 1. Canada exports more than 70 percent of its canola oil — over 400,000 tons — to the United States. Current U.S. canola production is almost two million acres; 650,000 acres are in Minnesota and North Dakota.

Canola is similar to sunflower in return per acre and may be more profitable than wheat. Producers can double-crop, as canola is planted in the fall and harvested in the spring, and small grain farmers can use their existing equipment. To grow canola successfully, good drainage is essential, and the fields must be free from canola or other cole crop production for four years.

The average net return per acre is $23. Prices per ton are about $220 for canola seed, $339 for oil, and $167 for meal. However, prices are declining.

Functional values

Canola oil is low in saturated fats — 7 percent or less — and contains significant amounts of essential fatty acids, including oleic acid, claimed to lower cholesterol, linoleic acids and linolenic acids, which aid the immune system and blood clotting. In the United States, 45 percent of margarines, 60 percent of shortenings, and 80 percent of salad dressings contain canola oil.

High-oleic and low-linolenic canola oils can be made shelf-stable without extensive hydrogenation, so they are low in the trans fats said to cause heart damage. These fats also hold up to high cooking and frying temperatures and are ideal for biodiesel.

Genetically engineered high-laurate canola oil is less expensive than tropical oils such as coconut and palm kernel. Laurate's sudsing quality makes it useful in shampoos, soaps and detergents. The silken texture is ideal for chocolate-flavored candy coatings, frostings and whipped toppings, and as a dairy substitute in coffee creamers. Calgene is the only laurate canola supplier.

Areas of opportunity

Fuel markets: Canola oil can be used for both biodiesel and motor oil, although soybean oil may be more economical

Gourmet cooking oil: Virgin canola oil may be promoted as a substitute for imported olive oil.

Lauric oil markets: Domestically produced high-laurate canola oil could potentially replace some of the $400 million of tropical oil imported annually, primarily from the Philippines, Malaysia and Indonesia. The worldwide lauric oil market exceeds 10 billion pounds and is expected to increase as economies improve in China, Southeast Asia, Eastern Europe and Latin America.

In Minnesota, processing just 100 million pounds of lauric oil would require more than 150,000 acres of canola, and generate more than $35 million in the rural economy.

Flax
BLUE FLOWERS, SEEDS OF GOLD

Flax, also known as linseed, is one of the oldest domesticated crops, used by ancient Egyptians to make linen wraps for mummies. It is also one of the most beautiful crops; for two to three weeks of summer, its bright blue flowers open after sunrise and fall before noon.

In the United States, commercial fiber flax production began in 1753, but declined after the cotton gin was invented in 1793. By the 1940s, fiber flax became almost extinct in the United States. Today, only the Soviet Union, Poland and France have significant fiber flax acreage.

While the fiber flax market appears limited, interest is growing in seed flax, as linseed oils are rich in omega-3 fatty acids. U.S. flaxseed production is concentrated primarily in Minnesota and the Dakotas. The annual plant is short — 12 to 36 inches — and has many more branches than fiber flax. Each stem bears capsules with 6 to 10 seeds each, which range in color from yellow-greens to black. Stems can be used for paper production.

Production notes

The global production of flaxseed is about 1.25 million tons per year; over 40 percent is grown in Canada. Britain and France are other major producers.

In 2001, the United States produced 11.5 million bushels of flax on 585,000 acres valued at about $50 million. Conversely, Canada's flaxseed crop is valued at $150 million. The U.S. imports about 1.9 million and exports about 2.4 million bushels of flax annually. North Dakota is the biggest U.S. producer with 327,000 acres yielding 6.8 million bushels annually.

In 2000, Minnesota grew about 10,000 acres of flaxseed yielding 198,000 bushels valued at $670,000. Per-acre yields average 18 to 20 bushels which sell for $4 to $5 each. For the yellow flaxseed varieties commonly grown for the health food market, return per acre is about $100.

The self-pollinating spring annual varieties grown in Minnesota mature in 90 to 110 days. Flax does best in moderate or cool temperatures with adequate rainfall on fertile, fine-textured clay soil. Harvest timing is critical; yields are reduced if it's too early and the oil changes and loses value if harvested too late.

A new form of flax or linseed called "linola" or "solin" was developed in Australia in 1992. Commercial production started in 1994 and expanded to Canada, Britain and the U.S. states of Washington and Idaho. Linola, grown for its oil, can substitute for flax in crop rotations. It is less expensive to grow than canola but brings in comparable prices.

Functional values

Flaxseed oil is 57 percent omega-3 fatty acids, more than any other seed or fish oil. It is also rich in omega-6 and omega-9 essential fatty acids, B vitamins, fiber, protein, potassium, lecithin, magnesium and zinc.

Flaxseed oil is claimed to reduce high blood pressure, cholesterol and the risk of heart disease. Some claim it can also help treat eczema, psoriasis, arthritis and menstrual pains.

Flax meal is 35 percent crude protein, optimal for livestock feed.

Areas of opportunity

Nutraceuticals: Flax oil is the best source of omega-3 fatty acids, with a myriad of health benefits. Its use is doubling annually. Flax is also a good source of fiber and anti-carcinogenic lignans. Whole ground flax seed is added to bread and other bakery products to boost nutritional content.

Omega-3 Eggs: Hens fed flaxseed produce eggs high in omega-3s, which are sold for double the retail price of traditional eggs.

Industrial Uses: Linseed oil is being used as an anti-spalling treatment for concrete to

QUICK FACT: Cuphea, domesticated only recently and not yet commercially produced, is a good source of laurate oil used for detergents and cosmetics.

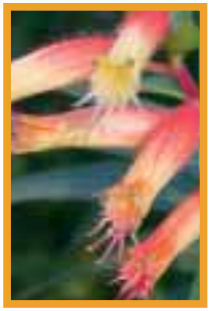
prevent street and sidewalk breakup. Linseed oil has been used as a drying agent for paints, varnishes, lacquer and printing ink. However, synthetic resins and latex have eroded these markets. Stem fiber is used to make furniture padding and fine paper; some is used for cigarettes.

Livestock Feed: Linseed meal's high-protein content makes it ideal for livestock and pet feed.

Cuphea

THOSE STICKY AMERICAN PLANTS

Cuphea (KOO-fee-uh), a sticky plant with colorful, showy flowers, originated in Central America and was domesticated a few years ago by Oregon State University researchers. Currently, there is no cuphea market, but its tiny seeds are rich in laurate, a fatty acid also found in tropical oils such as palm and coconut. Laurate's sudsing quality makes it desirable for soaps, detergents and cosmetics.



Of the 45 cuphea varieties, 18 are potential agricultural crops. Various species grow from eight to 16 inches high and are cross- or self-pollinating. Researchers are breeding cuphea cultivars for lauric acid and medium-chain triglycerides for markets such as candy and chewing gum.

There are no commercial oil processing plants for cuphea. And because the plant is sticky and seeds shatter easily, current production equipment can't be used. Some companies are experimenting with a transgenic sunflower, incorporating a cuphea gene to solve production problems.

Production notes

Currently, cuphea is grown in many third world countries as well as the United States, where most research is being conducted. Research is also being conducted in France, Italy, Greece, Portugal and Spain.

Since cuphea was domesticated only recently, it has many wild characteristics. Producers and manufacturers are leery of some of the annual's traits: it does not tolerate frost, the seeds shatter easily, flowering is unpredictable, and the stems, leaves and flowers are covered with sticky elastic hairs. Breeding could overcome such undesirable traits as frost resistance, but researchers debate about developing non-sticky varieties, as the hairs immobilize aphids and other insect pests. Germination is slow (14 to 20 days), yet the plants grow quickly and seeds ripen in only six weeks, making it ideal for short-season temperate climates

The plant has done well in west central Minnesota field tests, especially if planted by mid May. Trials suggest cuphea could be planted with traditional farm equipment and rotated with corn and soybeans every three years.

Because cuphea is a rich source of laurate, Proctor & Gamble has long been interested in it, not only for detergents, but also for nutraceuticals and pest and disease control. The company is sponsoring research in the Midwest, where cuphea could be profitable — although commercial production is likely years away. If cuphea oil were substituted for all imported tropical oils, 2.75 million acres would be required to produce the seeds (a value estimated at $1.12 billion). In Minnesota, the seed value from 153,000 acres would be almost $100 million per year.

Functional values

Despite all its production obstacles, cuphea is highly desirable because a single crop can produce a string of high-value fatty acids: caprylic, capric, lauric and myristic. Currently, the only commercial sources of these acids are coconut and palm kernel oils, and price rises are spurring interest in alternatives. Perhaps no other oilseeds in the United States can economically replace fatty acids from imported tropical oils.

Areas of opportunity

Chewing gum and confections: Cultivars are being designed specifically for candy and chewing gum. The Wm. Wrigley Jr. Company has patented a base formula for chewing gum, replacing saturated fatty acids and plasticizers like glycerine with cuphea oil, which improves flavor and reduces saturated fat. Cuphea oil also works well as a flow carrier and solvent in candy manufacturing.

Detergents and cosmetics: This is a high-volume market area — a half-billion dollars annually in the United States — where cuphea could replace imported palm kernel and coconut oil. Fatty acids such as laurate act as a defoaming agent and booster in soaps and detergents.

Buckwheat

RHUBARB'S COUSIN FROM CHINA

In spite of its name, buckwheat is not a wheat, nor is it related to any small grains. Its gray-black seeds, similar in size and weight to barley, are classified as fruit.

A broad-leaf plant in the rhubarb family, buckwheat is believed to have originated in China. It is adaptable to many soils and prefers cool climates. Because buckwheat is not related to other grains, it can easily be grown in rotations.

Almost 14 percent protein, buckwheat is high in vitamins and minerals and can significantly boost the nutritional value of foods. Buckwheat is most commonly used in Japanese soba noodles but is also being added to breads, pasta, canned meats, even ice cream cones.

Production notes

The world's buckwheat production is about three million tons annually. Russia accounts for about 90 percent; other producers include China, Japan, Poland, Canada, Brazil and the United States.

The United States produces about 24,000 tons per year, primarily in the Dakotas, Minnesota and Washington. Japan imports 80 percent of its buckwheat — 80,000 tons per year — from the United States and Canada.

The biggest U.S. producer is North Dakota with 24,000 acres — almost as much as Canada's 30,000 acres. Minnesota is only a small producer with 4,000 acres. Yields generally range from 500 to 2,000 pounds per acre; the cool, moist climates of northern Minnesota yield about 1200 to 1600 pounds per acre.

Buckwheat is planted in late May to mid June; it can be planted up to July 1, but yields will be reduced. Traditional small grain machinery can be used to plant and harvest buckwheat.

Buckwheat germinates in five to seven days, flowers in about five weeks and matures in 75 to 90 days. It requires less nitrogen than cereal crops as it is efficient at pulling phosphorous from the soil. It is competitive with other crops and many organic farmers include it in their rotations to suppress weeds. However, it wilts in hot weather and does poorly in drought conditions. Also, buckwheat does not tolerate frost, so an early freeze can severely affect yields.

Buckwheat yields are low, relative to small grains, because only 10 to 20 percent of its flowers develop seed heads. Because buckwheat is cross-pollinated and cannot be inbred, not much has been done to improve yields. However, a new high-starch, large-seeded variety, Koto, has been grown in Canada for about three years.

Despite low yields, buckwheat is profitable, with an average return of $83 per acre; spring wheat is about $35 per acre. Producers can sell food-grade buckwheat for about 10 cents per pound, although prices up to 13 or 14 cents are possible. The hulls bring 50 cents per pound.

Functional values

The human body can use 74 percent of the available protein in buckwheat. The seed has twice the lysine of wheat and white rice and is virtually free of fat and gluten. It requires little cooking and has good shelf life.

Sterols, polyphenols, fagopyritol and rutin in buckwheat help rid the blood of cholesterol. Rutin keeps capillaries and arteries strong and flexible. Buckwheat also contains choline, good for liver health, and is high in vitamins B1 and B2, potassium, magnesium, phosphate, iron, vitamin E and dietary fiber. There is some evidence that buckwheat can help manage blood sugar levels and reduce blood pressure.

Areas of opportunity

Food products: Buckwheat is used in Japanese-style soba noodles. Minn-Dak Growers Ltd., of Grand Forks, N.D. has been supplying buckwheat to the Japanese for over 20 years, primarily flour for pasta. The processor is now developing other buckwheat products, including bread mixes, tortilla wraps and a puffed snack. Meat extenders, pancakes, syrups, cereals, desserts and soups can all be made with buckwheat. The roasted groats (dehulled seeds), called "kasha," are popular in cereals.

Functional ingredients: Buckwheat is used in energy bars and some gluten-free foods. The starch can replace fat in processed foods.

Hulls: One bushel of buckwheat yields 18 pounds of hulls, used in landscaping mulches, packing materials and even therapeutic pillows and mattresses.

Export markets: Producers can contract for Japanese markets, which use about 100,000 tons of buckwheat per year; 80 percent is imported. In Eastern Europe, buckwheat flour is used like wheat flour; kasha (the roasted seed) is popular in Central Europe. ■

QUICK FACT: Minnesota growers planted 40,000 acres of sunflowers in 2002.

Sunflower oil study

PHOTOS BY ROLF HAGBERG

Bismarck, N. D. — Last year, Minnesota growers planted about 40,000 acres of sunflowers, many of which were NuSun™ varieties. For those growers, the future may be a bit brighter, thanks to the results of a new diet study.

Initial results from a study comparing a NuSun sunflower oil diet, an olive oil diet and an "average" American diet showed a diet incorporating NuSun reduces total cholesterol by 4.7 percent and LDL cholesterol by 5.8 percent over the average diet. The olive oil diet showed no significant cholesterol reductions compared to the average American diet.

Results were obtained from Pennsylvania State University, which evaluated 31 men and women with slightly elevated cholesterol.

The research suggests NuSun's balance of fats lowers cholesterol. NuSun oil contains monounsaturated fat, similar to olive oil, along with adequate amounts of polyunsaturated fat. It is also low in saturated fat. This profile makes NuSun a shelf-stable oil that doesn't require hydrogenation and works well for commercial use. Several large food processors, including Frito Lay, Proctor & Gamble and Barrel O' Fun, already use NuSun oil for cooking some of their products.

"This is definitely positive news and will help us tell the story of this healthy product and help us get it on the map," says Ruth Isaak of the National Sunflower Association. "We hope the results will help us create long-term demand."

"These performance characteristics … should help create demand for the product that ripples all the way to the producer," says AURI scientist Max Norris. AURI was one of several organizations supporting the dietary study. "The toughest thing about introducing a new product is creating demand. NuSun has suitable characteristics that consumers will demand." ■

For more information on the NuSun findings, visit the National Sunflower Association Web site at www.sunflowernsa.com.

Ag on the Web

BY JENNIFER PEÑA

AURI clients, like the rest of the Internet world, are evolving to keep up with Web technology. To get you browsing and shopping our clients' pages, we have found a few to spark your interest. If you want more, click on over to Client Connections at www.auri.org.

Eichten's Hidden Acres

www.specialtycheese.com

Eichten's Hidden Acres of Center City, Minn. is celebrating its 25th year and has several lines of specialty cheeses, bison and gift packages to show for it. Browse the online catalog, through a variety of cheeses and meats, or read up on how to prepare and keep cheese or cook bison using Eichten's own recipes. And if you've tried one of their products, write a review online for others to read.

Liberty Land & Livestock

www.ourfarmtoyou.com

This Hutchinson farm, specializing in lamb, has its own retail store, a USDA processing facility, a sheep-shearing business and an educational program. Its elegant site is a complete guide to Liberty's services and products, with plenty of colorful photos. Take a photo tour of the Lamb Shoppe or the farm, see what's next on the event calendar, read about Liberty Land in the news, or order from an extensive list of available products, including cuts of naturally raised lamb.

Papa George

www.papageorges.com

Papa George has been working hard to revamp this site featuring ethnic lamb and pork products. An exciting addition is a streaming media option called Cooking on Demand for browsers who would like to see live video of events, testing and cooking, or listen to a few Papa George jingles. Print a few recipes or submit an entry to the recipe contest.

StarchTech

www.starchtech.com

StarchTech, Inc. makes a variety of biodegradable products from starch. Its EcoSystem Packaging Solution offers a way for packers to efficiently produce packing "peanuts" on demand. Clean Green Packing, a subsidiary, produces biodegradable loose-fill packing material. StarchTech also specializes in compounding starch-based polymers for customers of all sizes. The site lays out the company's products, services and contact information in an easily accessible format.

Penn Foods

www.pennfoods.com

Love lefse? Penn Foods of Fertile, Minn. has upgraded this Web site to include more photos and information for their product line. Available for purchase are several Scandinavian mixes, such as potato dumpling, potato lefse, five-grain pancake, and bean soup. Click on the product of your choice and get simple cooking directions. To order, print the mail order form from the site. And if you've tried the mixes, leave a comment for others to read.

RBJ's Spreadable Fruit

www.spreadablefruit.com

Besides its delicious spreadable fruits, RBJ's has added signature syrups, whipped honey, jellies and boxed gift sets. Still available are the rhubarb-strawberry, strawberry-almond, and strawberry-peach flavored spreads. RBJ's site also has recipes such as stuffed French toast, brochures and press releases, an easy-to-use online ordering option and an e-newsletter signup.

Pet Care Systems

www.swheatscoop.com

Created for the safety of pets as well as people and the environment, Pet Care Systems, Inc.'s SwheatScoop has become a widely available cat litter. Pet Care Systems has included customer comments, safety issue and comparison articles, and environmental facts about their product, as well as links to other pet resources. Order SwheatScoop from the site, or use the store locator for a retailer near you. And check back for upcoming coupons and special offers.

Redwood Candle Company

www.redwoodcandle.com

There are candles, lotions and scents galore in Redwood Candle's online catalog. These products come in scents as far-ranging as apple pie, margarita, orange dreamsicle, sea breeze and sugar cookie, to name a few. Redwood's soot-free, 99 percent soybean wax candles are also available at a large number of stores, which you can find by using their store locator.

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"What we're doing and how we're doing it is different than anyone else." — Jim Thompson

Tiny minerals in the feed

Alfamin supplements good for animals, researchers find

BY DAN LEMKE

Waconia, Minn. — Sandy Karstens has a knack for waiting patiently through life's trials.

As president of RK Marketing Enterprises, Karstens produces and promotes Alfamin® brand feed supplements for animal health. The company says Alfamin's trace minerals, such as zinc, copper and manganese, foster good health and improved fertility in cattle, horses, hogs and poultry.

While Karstens has been selling the alfalfa-based feed additives successfully for several years — even as far away as South Korea — she needs some independent research results before making a stronger push.

"We've been waiting for documentation to back up our claims," Karstens says. "We've had interest from people, but until we get the results back, some are holding off."

Trials hit the mark

"We've had positive results from some on-farm trials," says Jim Thompson, an animal scientist and consultant working on behalf of RK Marketing. "One particular dairy farm had problems with high somatic cell count (often caused by infections in the udder). After two weeks of supplying the Alfamin zinc, we cut the count in half without changing any management practices."

The trace ingredients in the Alfamin products promote animal health from the inside out. "If you create an intestinal tract that is working optimally, the gut will absorb nutrients better and the animal will use them properly," Thompson contends. "What we're doing and how we're doing it is different than anyone else."

Recently completed tests are providing RK Marketing with much of the research to validate their claims.

AURI technical services specialist Alan Doering helped connect the company with dairy researcher Hugh Chester-Jones at the Southern Research and Outreach Center in Waseca, Minn. He conducted tests on cows at the University of Minnesota's St. Paul campus.

Since the supplement's trace minerals need to be available for the body to absorb, rather than simply pass through the digestive system, tests included placing small feed bags containing Alfamin directly into cows' rumens. After a period of time, the bags were removed and their contents tested to determine what was absorbed by the animals and how much. The research determined the minerals in Alfamin were readily absorbed.

Taking care of details

RK Marketing founder Ron Karstens first came to AURI in the fall of 2001 with some technical challenges. Karstens was having difficulty mixing Alfamin thoroughly and lowering its moisture far enough for a stable shelf life. Doering helped RK Marketing troubleshoot the process to best manufacture the product.

Then, in February of 2002, Ron died suddenly. His wife Sandy, a retired Cargill employee, took over the company and is working to raise it to the next level.

"There is large market potential for the Alfamin products because the nutrients they deliver are critical, especially to beef and dairy cattle," Doering says. "Plus, it's a Minnesota company using Minnesota-grown alfalfa to help deliver the minerals to the animal."

Armed with new research data supporting nutritional claims, Karstens expects the market for the Alfamin products to grow, but she is taking the same cautious approach espoused by her late husband.

"Ron always said it was worth being patient in order to get the research you need. With the results we have, we plan to move carefully and see where it goes." ■

For more information on the Alfamin products, visit the RK Marketing Web site at www.rkmarketing.com

President of RK Marketing Enterprises, Sandy Karstens, and animal scientist Jim Thompson, now have trial results confirming that Alfamin feed supplements improve livestock health and fertility.