



# AG INNOVATION NEWS

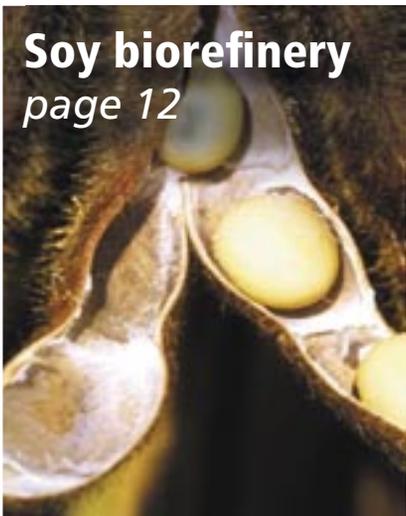
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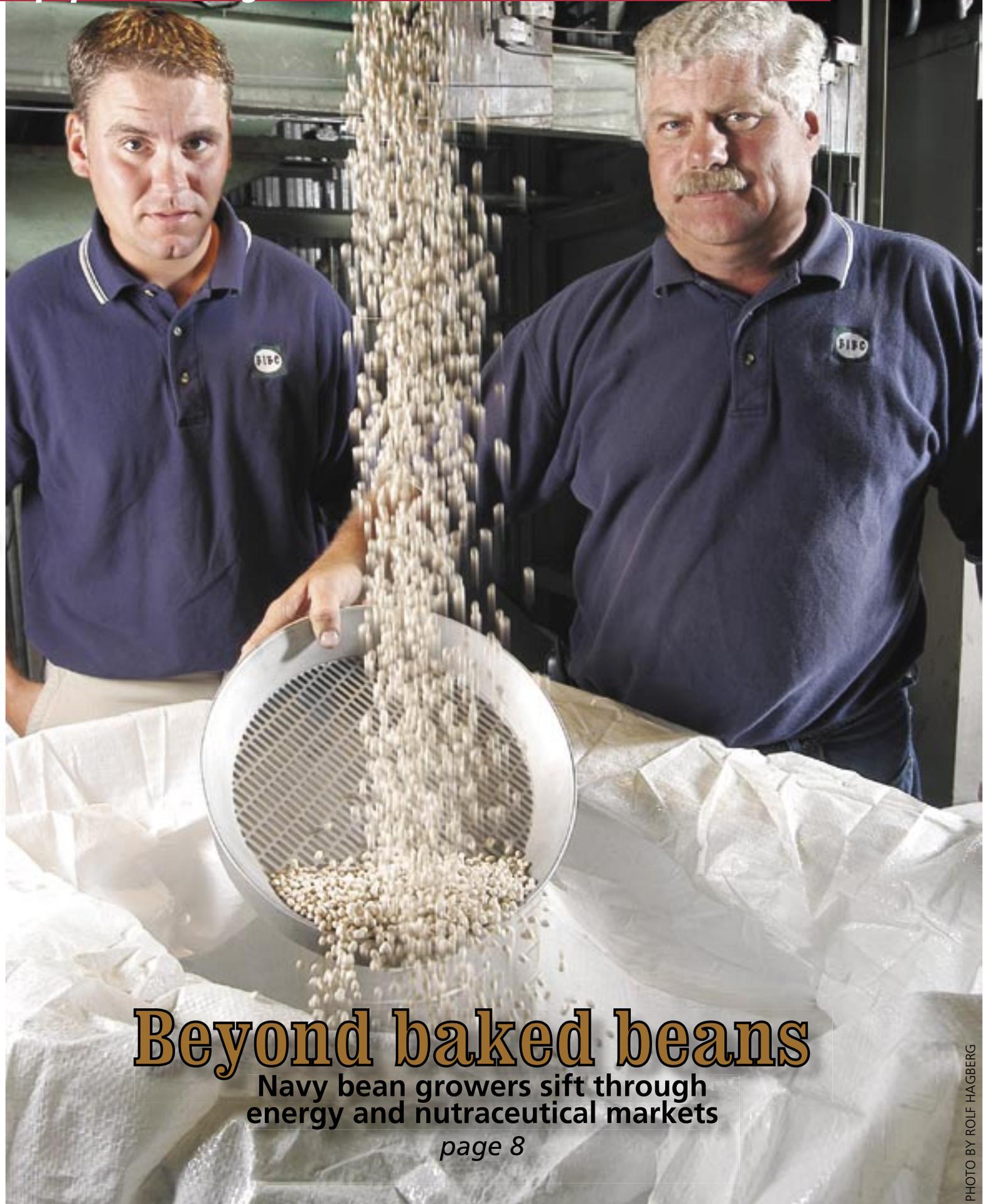


**First poplar harvest**  
page 3

**Dressing potatoes**  
page 11



**Soy biorefinery**  
page 12



## Beyond baked beans

Navy bean growers sift through energy and nutraceutical markets

page 8

PHOTO BY ROLF HAGBERG

## An open letter from AURI Executive Director: Meeting change head on

BY EDGAR OLSON

**Change is inevitable. Change is continuous. Change is difficult.**

**Right now, AURI is facing the difficult.**

Over four of the past five years AURI has contended with declining financial support from the State of Minnesota. The most recent—and most painful—blows have led to significant changes in our organization.

In an effort to deal with a looming state budget deficit, the legislature reduced AURI's funding by nearly 60 percent. For a small organization with limited resources, those reductions have forced major changes that impact not only AURI, but our ability to serve Minnesota agriculture.

Over the past several years, we have managed budget reductions by not filling positions vacated by retirement or job turnover; the duties were parceled out to other staff or simply set aside. We have closed two offices, Morris and St. Paul, making AURI staff less accessible. We have also reduced staff and closed lab facilities to deal with the reduced funding.

Cost cutting is only one component of dealing with change. We are also streamlining our activities, focusing on our strengths and eliminating activities that may not significantly impact Minnesota agriculture. We have reprioritized the efforts of all staff members, as well as AURI programs. Services are being reduced, consolidated and, in some cases, eliminated.

We may not be able to assist with as many projects, but we will continue to focus on activities that have the greatest impact on the largest number of Minnesota producers. We will continue to focus on researching crop-based fuels, developing new uses for ag coproducts such as processing waste or ethanol sidestreams, as well as meat processing and product development. These areas provide opportunities to further develop Minnesota's agricultural processing industry.

AURI staff and programs will critically evaluate all potential projects to ensure that resources are directed to projects that have the maximum benefit to Minnesota agriculture. As such, partnering with commodity groups, producer and farm associations and other organizations will be key to developing successful value-added projects.

Our mission is to improve Minnesota's rural economy through the development of new uses and markets for the state's agricultural commodities. Even in times of turmoil, that will not change.

AURI is hardly the first organization dealt a difficult hand. Like others before us, AURI is rolling up our collective sleeves and meeting the challenge head on. We are doing so by making tough choices, prioritizing our efforts and focusing on what we do well.



OLSON.

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

#### AURI Offices

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For staff e-mail addresses, visit AURI on the Web: [www.auri.org](http://www.auri.org)

## AURI clients honored

### Van Thorre awarded 'Innovator of the Year'

Golden Valley, Minn.

— Doug Van Thorre, president of Biorefining, Inc., was presented an "Innovator of the Year" award by the business and financial newspaper, Finance and Commerce, at a September 5 event in Minneapolis.

A panel of editors and Minnesota business leaders selected 15 award recipients from across the state. Those honored have created new products, services, programs or processes that have had a positive effect on their business, industry or community.



Van Thorre.

Biorefining, Inc. extracts high-value components from carbohydrates found in distiller's dried grains, sugar beet pulp, citrus pulp and soybeans. The nutraceutical ingredients are used in a variety of specialty products such as sports drinks and fluoride replacements. AURI assisted the company with technology development.

Van Thorre was honored for creating new economic opportunities for the agricultural processing and ethanol industries and for improving the rural economy.

### Samuelson named an "Entrepreneur Champion"

Crookston, Minn. — Kim Samuelson, president of RBJ's Inc. in Crookston, Minn., was honored as an "Entrepreneur Champion" at the 2003 Minnesota Rural Summit in Mankato, Minn., held August 3-5. Samuelson was one of 25 entrepreneurs selected by a Summit committee's peer nomination and review process for making a real difference in their rural communities.

The Rural Summit, sponsored by a coalition of organizations with rural interests, advocated entrepreneurship as an economic development strategy for rural communities. The event

featured tools, information and people available to help entrepreneurs.

"It is quite an honor ... it's wonderful that the Rural Summit is focusing on this unique segment of businesses," Samuelson says. "I truly love my job and its challenges, as well as the experiences I have encountered along the way."

RBJ's Inc. has been serving Crookston and its surrounding communities for more than 20 years. Beside its restaurant and full-service catering business, the company manufactures and sells Signature syrups, jams, mixes and honey nationwide. RBJ's has received technical and product development support from AURI. ■



Samuelson.

### ABOUT AG INNOVATION NEWS

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PHOTOS BY DAN LEMKE

## Research pioneers harvest first hybrid poplar crop

BY DAN LEMKE

*Ulen, Minn.* — On a warm June day, Wendell Johnson watched heavy equipment lumber up and down field rows, harvesting the crop he had nurtured for 14 years.

This was anything but a typical harvest.

The field was planted in 1988 and 1989 with some of Minnesota's first hybrid poplar cultivars. And it may be the first poplar harvest in Minnesota history.

Johnson, a University of Minnesota-Crookston researcher, planted poplars on 45 acres of Conservation Reserve Plan (CRP) land, owned by Ulen farmer Lynn Stumbo, to study the fast-growing trees as a potential agricultural crop.

In March of 1996, Johnson and Ed Wene, an AURI scientist, helped to organize the Minnesota Hybrid Poplar Research Cooperative, a public-private partnership, to investigate short-rotation forestry in Minnesota.

This summer, the co-op harvested about 10 acres of the research field using commercial logging equipment. The heavy harvesters rumbled along the neatly spaced rows, clasp standing trees with hydraulic arms. Once cut, the trees were loaded onto trucks and shipped to the Potlatch mill in Bemidji, Minn. where the fiber will be used for oriented strand board.

Wene, who participated in the inaugural harvest, said that although there was a keen interest in the results, "We knew what kind of stand we had, so there were no real surprises."

Wene says the yield should be consistent with the clones' expected production at the time they were planted. With more years of research and improved genetics, the cooperative is "hoping to improve yields with newer clones," Wene says.

Beside AURI and U of M-Crookston, members of the Minnesota Hybrid Poplar Research Cooperative include Blandin Paper, Boise Cascade, International Paper, Lee Nursery, Minnesota Power, Potlatch Corporation and the Natural Resources Research Institute.

Next spring, the harvested field will be replanted with young clones. Portions will be planted after removing the old stumps; another area will be restocked without removing stumps to compare the two second-generation planting conditions.

Besides harvesting 10 acres of the research field, portions of the remaining 35 acres were thinned by removing every third row of trees. "We'll be able to look at how 12- and 13-year-old trees respond to thinning," Wene says.

The first commercial hybrid poplar harvest was not only a landmark event for poplar research, it opens up opportunities for a new battery of tests for this woody agricultural crop. ■



The long-awaited  
**harvest**



# FASHIONABLE FOOD

## Researchers are fitting crop components into medicinal, nutraceutical and cosmetic products

*Note: This is the second segment in a series on commodity functional-use studies sponsored by AURI.*

BY CINDY GREEN

To be a trendy 21st century food product, touting vitamins and minerals alone won't cut it. Chances are better if heart-healthy, anti-oxidant, cholesterol-lowering or anti-aging is in your job description. A food crop's hidden components — beta glucans, lysine, folic acid — get the market's attention.

To uncover special qualities and opportunities for Minnesota crops, AURI is examining the functional traits and production trends of 11 grains. Some crops, such as wild rice, dry edible beans and oats, do not currently have a major presence in the state. But their exceptional attributes may be useful to highly-profitable functional food and nutraceutical markets.

Commodity groups are keenly interested in nontraditional markets. For example, the Northarvest Bean Growers Association, which represents Minnesota and North Dakota growers, is sponsoring conferences on health food, pharmaceutical and industrial product



Northwoods Blend® shampoos, lotions and soaps contain wild rice, a natural exfoliant that contains antioxidants and protein.

developments (see accompanying story, "Be'an smart" on page 8). Studies show folate in beans can reduce the risk of heart disease, stroke and certain types of cancer. Protein extracts and dietary fiber from beans can be used as nutraceutical ingredients in breakfast and snack foods.

Researchers are also probing wild rice traits. In the mid-1990s, an AURI study confirmed that wild rice has anti-oxidant properties that can extend meat's freezer life. "That study was the precursor to all of the meat products you now see with wild rice," such as brats, burgers, sausages and other ground-meat products, says Beth Nelson, president of the

Minnesota Wild Rice Council, a study co-sponsor.

"Wild rice keeps products fresher longer and, if you're using a dryer meat, like buffalo or venison, wild rice adds moisture," Nelson says. The council is looking at other product blends, but some combinations are challenging: "If you add wild rice to products with sugar, it can pull moisture, but we have been experimenting with it," Nelson says.

Research and development is crucial to jumpstart a stagnant wild rice market, Nelson says. "We're not seeing (market)

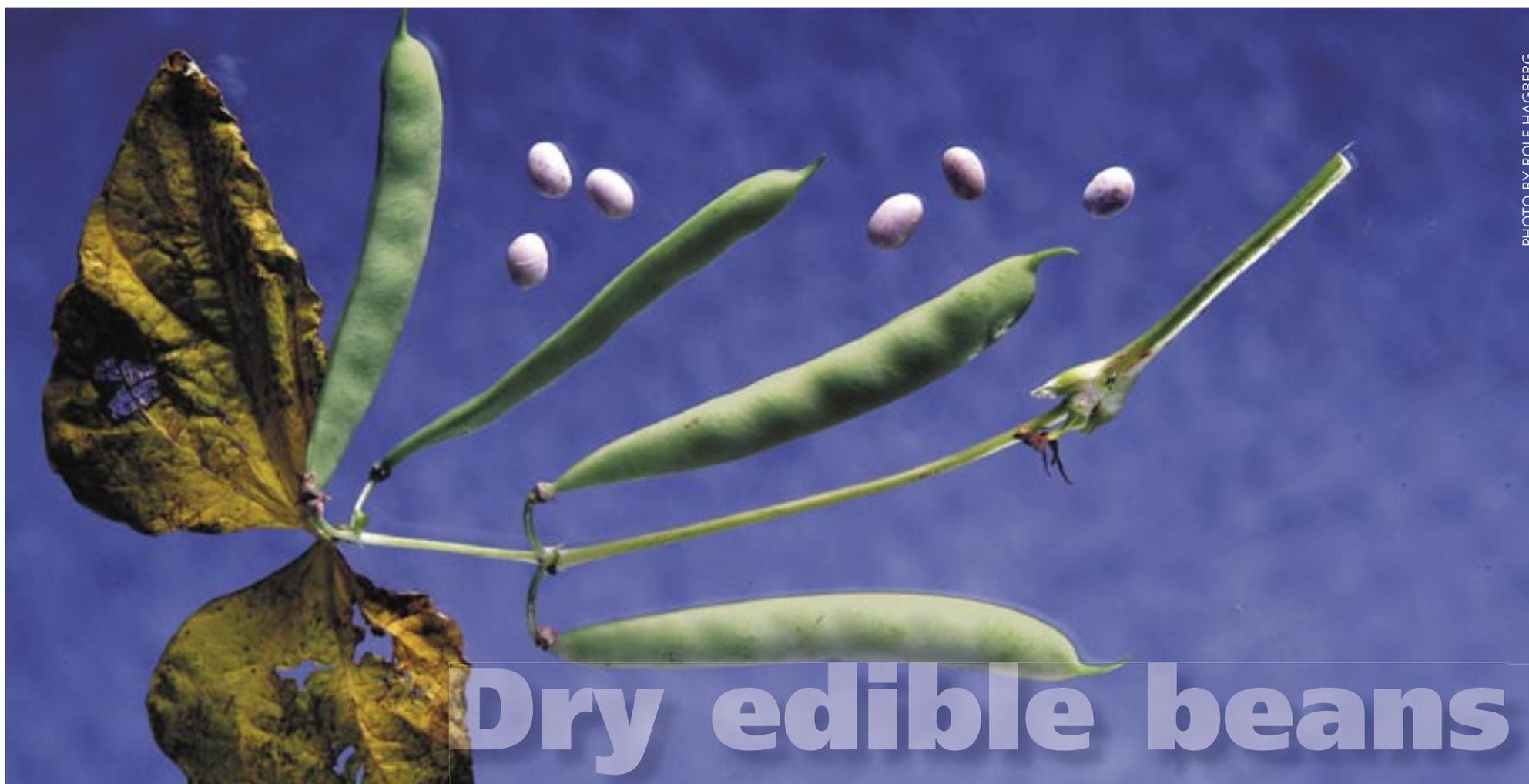
decreases but the growth is very slow."

Wild rice was highly profitable when it was first cultivated in the 1950s; consumers were already accustomed to paying high prices for hand-harvested grain. But as yields improved and acreage climbed, prices leveled off. Recent economic strains on gourmet food and gift markets have not helped. But the council is hoping more studies on wild rice's functional or medicinal traits will pay off. "It's big stuff," Nelson says. "There is a lot of potential in the area of nutrition."

Wild rice may also benefit skin care. Dawn Thiel of Minneapolis, who founded

Botanicare Inc. in 1995, is using wild rice in her Northwoods Blend® shampoos, lotions, soaps and body wash. Her cosmetics, available through mail order or Twin Cities and northern Minnesota specialty shops, feature all-natural ingredients, no animal products and plant materials indigenous to Minnesota such as cranberries and wild rice. Besides antioxidants, wild rice is a good source of protein that "has conditioning and strengthening properties that stay behind after rinsing and give products a nice feel on the hair and skin," Thiel says. She also uses ground wild rice as an exfoliant in soaps.

"The functional attributes of many traditional foods are being discovered," leading to new product developments, says AURI scientist Charan Wadhawan. But to confirm a food's benefits "a large body of scientific research is needed." AURI's study will help grower groups identify research that could lead to high-value products. The intent is to "help growers diversify, yield higher returns and, of course, promote consumer wellness through food." Beside wild rice, dry edible beans and oats featured in this section, other crops investigated include amaranth, canola, flax, cuphea, buckwheat, barley, wheat and sunflower.



## Protein power packed in colorful seeds

**B**eans are one of humankind's oldest foods, domesticated 7,000 years ago in Peru and southern Mexico, where Indian tribes developed various colors and sizes of dry beans. Belonging to the legume family — seed-pod producing plants — beans' oval shape distinguishes them from flat-disk lentils and round peas. Dry edible beans are harvested as mature, dry seeds, unlike green beans and soybeans, which are harvested as succulent vegetables. They require only minimal processing from farm to consumer.

About 14 percent of the U.S. population consumes dry beans on any given day. Pinto beans are the most popular — with almost half the sales — followed by navy, Great Northern, red kidney and black beans. Although these are the most well known, there are many other varieties such as lima, garbanzo, cranberry and pink beans.

While most dry beans are used whole in food products such as refried beans, chilis and soups, high-value bean protein and starch fractions are used as nutraceutical ingredients in cereal products.

### Production notes:

The United States is the fourth-leading dry edible bean producer, behind India, Brazil and Mexico. In 2002, the United States planted 1.9 million acres of dry beans that yielded an average of 1,772 pounds per acre. The total production was 29.9 million hundredweight for a producer market value of \$519.6 million, according to the USDA. The United States has experienced a dry bean trade surplus for decades, with Mexico and the United Kingdom comprising the bulk of imports.

U.S. dry bean consumption has been on the rise since 1980; the current 7.4 pounds per capita is up from about 6 pounds in the 1980s. The primary consumer group is adults, ages 20 to 59, who consume 9 pounds per capita. Some speculate that dry bean consumption went up last year because of the cold winter and slow economy, as edible beans are an inexpensive protein source.

North Dakota and Michigan are the top-producing states, with 45 percent of U.S. production, followed by Nebraska, Colorado and Minnesota. Although Minnesota's 170,000 dry bean acres represents only 8 percent of total U.S. production, the state produces 54 percent of the nation's dark red kidney beans, grown primarily in the Red River Valley.

Dry beans' seed and pesticide costs are higher than soybeans, and storage can be

expensive. Because prices fluctuate, beans are usually stored to optimize selling price. Their moisture levels must be kept below 16.5 percent or the beans will be susceptible to mold.

Navy, pinto and kidney beans sell for \$10 to \$23 per hundredweight. Growers often contract about half their anticipated bean production with brokers or processors before planting. They must then deliver beans that meet certain variety, quality and moisture standards to be guaranteed a set price.

Dry beans have not been included in federal price support programs since the late 1960s. However, USDA regularly buys dry-pack and canned beans for school lunch, child nutrition and other food programs; in 1999 the USDA purchased 18 million pounds for such programs.

### Functional values:

Beans are nutritional powerhouses — high in protein (22 percent), soluble fiber (7 percent), vitamins and minerals, free of cholesterol, and low in calories and sodium. An inhibitor in beans prevents humans from digesting the protein, but it can be deactivated with cooking. Beans are especially rich in B-vitamins, folic acid, iron, calcium, potassium and phosphorous, and they may lower blood cholesterol levels, according to the American Cancer Society.

Studies show folate in beans can reduce the risk of heart disease, stroke and certain types of cancer, as reported on the Northharvest Bean Growers Association Web site.

Protein isolates can be extracted from some bean varieties and used as a nutraceutical ingredient in breakfast and snack foods. Also, beans contain a high-amylase starch or resistant starch, an indigestible dietary fiber used in high-fiber foods.

### Areas of opportunity:

**Snack foods:** Extruded bean products, because of their high protein and fiber content, could be competitive in the snack food and sports-bar markets. However, bean off-flavors have to be removed.

**High-starch bean flour:** can be used in a variety of cereal products to boost dietary fiber.

**Protein concentrate:** is used as a nutraceutical ingredient and may be promoted in hypoallergenic foods as an alternative to other plant or animal proteins.

**Traditional food products:** Besides packaged dry beans, popular food uses include refried beans, chilis, soups and baked beans.

Note: Some of the information in this report is taken from an article by Gary Lucier, USDA Economic Research Service, in the August-September 2003 Northharvest Bean Grower publication.

SEE RELATED STORY PAGES 8-9

# Oats' heart-friendly beta glucans mimic fat

**F**or centuries, oats have been valued for the grain's medicinal qualities. As early as 400 BC ground oat was used on skin for drying and healing, and 17th-century New World immigrants used the grain to relieve stomach aches and other ailments. At the turn of the 20th century, several mills established the Quaker Oats Company and the cereal was a favored porridge until the 1950s, when oat production started to decline. In the late 1980s, studies revealing oat bran's heart-healthy attributes increased consumer demand for ready-to-eat oat breakfast foods and snacks. However, oats have never achieved major crop status or been profitable to grow in the United States. That could change with a new focus on oats' valuable components — especially beta glucans — that may help prevent heart disease and certain cancers.

## Production notes:

About 15 species of oats are grown in cooler regions of the world — primarily Russia, Canada, the United States, Finland, Sweden, Germany and Poland. Worldwide production has declined over the past 50 years. Russia produced 9.4 million tons in 1998 but only 4.5 million in 2000. Only Canada showed growth in the 1990s, with a record high 5.9 million tons in 1999. That is because Canada leads foreign sales — with 60 percent of the export market. The U.S. imports 1.7 million tons annually, primarily from Canada.

The United States produces mostly spring oats grown in north-central states. Minnesota leads the nation in spring oat production, followed by Wisconsin and North Dakota. In 2001, Minnesota produced 12.6 million bushels of oats valued at \$17.6 million.

Oats have not been a profitable crop; input costs generally exceed revenues. However, oat varieties are being developed with improved yields, higher protein content and stronger resistance to rust, disease and insects.

Oats contain 70 to 75 percent groat, which is milled into steel-cut oats, rolled flakes, instant flakes, flour and bran. The remaining hull is waste, but can be burned for energy.

Some hullless groats are being grown under contract for specific markets. "Naked oats" have a loose hull, which is blown away during combining. The crude protein, oil and energy content of the hullless variety is much higher

than regular oats and shipping and storage costs are lower. So it is well suited for some specialty food markets. However, yields are lower and because the skin coat is thinner, the oats can be damaged during combining, leading to rancidity problems in storage and reduced shelf life.

About 90 percent of U.S. oats are grown for livestock feed, as the grain is high in protein, fat and fiber. Food oats are used primarily in hot and ready-to-eat cereals, and some in

granolas, cookies, breads and other cereal products. Oats have excellent moisture-holding qualities that keep baked goods fresh. But they contain little gluten so they must be blended with high-gluten flours such as wheat to make yeast breads.

## Functional values:

Oats are valued for their beta-glucans, or soluble dietary fiber, which mimics fat as it gels at room temperature and liquefies during cooking. Products that contain at least 0.75 grams of beta-glucan per serving may use the FDA health claim: "Soluble fiber from

foods such as oats, as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease."

Soluble fiber is believed to help reduce total serum LDL cholesterol, blood pressure and help Type II diabetics by slowing blood glucose response after meals. Tocotrienols, Vitamin E compounds in oats, may also lower serum cholesterol

The insoluble fibers in oats have a laxative effect. The fibers may help prevent

gastrointestinal disorders and protect against colon cancer by diluting carcinogens in the gastrointestinal tract. Phytoestrogens in whole-grain oats may help prevent breast cancer and other hormone-related cancers.

Oat flour contains antioxidants that prevent fat-containing foods such as peanut butter, margarine, chocolate and doughnuts from going rancid. Oat flour also stabilizes fat in ice cream and other dairy products. Once reconstituted with water, oat flour forms a gel

that can be used in salad dressings, gravies, dips, soups, coatings and drink mixes. Gels can also replace fat in baked products.

Industrial applications include using oat flour as a preservative inner coating in paper-bag packages for salted nuts, coffee and potato chips. Furfural, derived from oat hulls, is used in solvents and resins

## Areas of opportunity:

**Beta-glucan concentrate:** De-fatted oat bran can be finely ground and fractionated to make a product with 50 percent more beta-glucans than regular oat bran. The concentrate could be added to food as a nutraceutical ingredient. Nurture, Inc. has introduced OatVantage™, an oat-based ingredient that manufacturers can use in foods, beverages and supplements to make the FDA heart health claim; only 1.5 grams delivers 0.75 grams of beta-glucan.

**Fat replacers:** OTRIM and Z-TRIM fat replacement products made from oat fractions have been developed by scientists from the USDA National Center for Agricultural Utilization Research in Peoria, Illinois.

**Food applications:** Soluble fiber is used to give products a fat-like texture, such as a whipped oat dessert, similar to ice cream. Oats are also used in salad dressings, sauce thickeners, ice-cream coatings and stabilizers, baby foods, beverages, baked goods and snack foods.

**Oat starch:** After beta-glucans are extracted, the small-granule starch that remains could be used in spoonable dairy products or cereals and snacks. Oat starch is slow to crystallize, so it is stable from freeze to thaw and holds up well under high temperatures and low pH conditions.

**Oils:** Next to corn, oats have the highest concentration of oil — about 6 percent. Crude oat oil contains a very high level of antioxidants, more than every major oilseed, grain or grain byproduct except wheat germ. Oat oil is rich in phospholipids and glycolipids, also called polar lipids, and are free of trans fatty acids. Breeders are working to design oats with even higher concentrations of oleic and linoleic fatty acids.

**Hullless oats:** A new high-fiber, high-protein pasta is being developed in Italy using a 60:40 blend of durum wheat and hullless oat flour, which is higher in protein.

Note: Some of the information in this report comes from the North American Millers Association Web site: [namamillers.org](http://namamillers.org)



# Oats

# Native grain's yields improve with new varieties

**T**he grain Native Americans called “manoomin” was named “wild rice” by early North American fur traders because it looks deceptively like rice. Actually, wild rice is a tall, blooming water grass — the only cereal grain native to North America. Wild rice has grown naturally for hundreds of years throughout the Great Lakes region. Since the 1950s, it has been cultivated as an agricultural crop.

In northern Minnesota, many Ojibway still follow the traditional Native American practice of harvesting wild rice in September during the Wild Rice Moon. To be labeled “hand-harvested,” wild rice must be tapped into canoes with sticks. About 100,000 pounds are still harvested by hand from natural stands every year.

In 1952, James and Gerald Godward started cultivating their own wild rice in a one-acre flooded paddy near Merrifield, Minnesota. By 1958, they were growing 20 cultivated acres. The rice company, Uncle Ben, Inc. started contracting wild rice acreage in 1965, and by 1973, with better shatter-resistant varieties, Minnesota wild rice production had increased to 18,000 acres.

## Production notes:

Cultivated wild rice is grown primarily on peat wetlands bordered by dikes to retain water. The grass, which grows to over 70 inches tall, has shallow roots and hollow stems. Wild rice matures in about 120 days.

Annual U.S. wild rice production is generally 8 to 12 million finished pounds, but some years it has exceeded 23 million pounds. Minnesota produces 4.5 to 6 million finished pounds of wild rice annually on about 17,000 acres. Although Minnesota has twice the acreage, California produces the same amount or more because yields are higher. However, University of Minnesota researchers have developed a new disease-resistant variety that increases yields by 40 percent and may keep Minnesota growers competitive with California.

Canada is the only other major competitor with about 1.7 million finished pounds. Almost all Canadian wild rice comes from natural stands or lakes seeded to wild rice, harvested by air boats with a front-mounted catcher. In North America, wild rice is also grown as a field crop in Idaho, Wisconsin and Oregon. Overseas, Hungary and Australia produce small quantities.

Costs are highest the first year of wild rice cultivation; beside paddy construction expense, seeding is about \$80 an acre. Because wild rice self-sows, seed costs are eliminated in subsequent years, but there are thinning and fertilizer expenses. After several years, losses from seed shattering increases and growers may follow their paddies to plant new shatter-resistant varieties.

An acre of wild rice yields about 725 pounds

of unprocessed or 290 finished pounds, as 60 percent of the weight is reduced during drying and processing. Traditional wild rice shatters easily and yields only 150 to 200 pounds per acre. Improved, non-shattering types can yield as much as 1,500 pounds per acre. Wild rice sells for about 60 cents per unprocessed pound, and producers can net about \$270 per acre.

North America is the world's primary wild rice supplier, with 14 major processing plants — six in Minnesota, four in California and four in Canada. Most Minnesota cultivated wild rice is purchased by Riviana Foods, Inc., which owns Gourmet House Wild Rice.

When wild rice blends were introduced, demand grew rapidly — by 52 percent from 1978 to 1984. Although blends usually contain only 15 percent wild rice, they make up two-third of wild rice sales.

## Functional values:

Wild rice protein has a higher concentration of the essential amino acids lysine and methionine than most other cereal grains, and the basic amino acid balance is slightly better than oats. Wild rice is also a good source of riboflavin, niacin, copper, zinc, folate and dietary fiber. Very few nutrients are lost during wild rice processing. Because of its nutritional benefits, wild rice may be added to other products to boost functional attributes.

## Areas of opportunity:

**Quick-cooking wild rice.** A quick-cooking frozen wild rice product was developed by AURI in 1995 and a frozen, pre-cooked wild rice is currently available in supermarkets.

**Health foods:** Cooked wild rice pieces could be added to sports and nutritional bars — a growth market.

**Specialty extruded pellets:** can be used in snacks, granola, dressing, soups and other health food products.

**Cosmetics:** A Minnesota company is using wild rice as an exfoliant and as a protein additive in skin care products.

**European export markets:** Belgium, Germany, France, the Netherlands and Great Britain present export opportunities.

Note: Some of the information in this summary comes from the Minnesota Cultivated Wild Rice Council and Erv Oelke, professor emeritus, U of M department of agronomy and plant genetics.



# Wild Rice



PHOTOS BY ROLF HAGBERG

## Be'an smart

### A Central Minnesota company is seeking new uses for low-value navy bean culls

BY E.M. MORRISON

*Bird Island* — From fuel to folic acid, navy bean growers are looking for ways to gain more value than they now get from a can of beans.

The Bird Island Bean Company is scouring the country for new navy bean markets — especially for low-value culls — beans that are damaged or don't make the grade during processing. The south central Minnesota bean company is not alone. Surpluses and low prices are spurring an industry-wide push to find new food and manufacturing uses for abundant dry edible beans.

Bird Island Bean Company operates one of the few navy bean handling facilities in central Minnesota. The company buys, cleans and ships beans, and also provides crop inputs and agronomy and marketing services. The venture began in 2000, after a major ag processor decided to mothball the 1969 facility. Willmar-area navy bean growers Duane and Nate Hultgren and Curt Meyer, along with plant manager Larry Serbus, bought the plant, which serves about 250 central Minnesota navy bean producers.

"We took on the plant because we had a good grower base, and the farmers needed us," says Serbus, 52, who has been in the dry edible bean business for more than 30 years. The Renville County plant is located in one of the top-yielding regions in the country for navy beans. And though dry bean prices are volatile, per-acre returns compare well

with other row crops, Serbus says. However, "there are only a couple of other outlets in the area for navy beans. We felt the farmers were interested in keeping us here."

#### Demand stagnant

Bird Island Bean, which last year posted sales of \$1.5 million, ships dry beans around the

region, marketing through ConAgra. Although it is small, the facility has some important competitive advantages, Serbus says. It is located near several large canning plants, which cuts transportation expense as much as \$1 a hundredweight — a significant savings.

Also, the facility has enough warehouse space to store an entire year's production, allowing farmers to take advantage of periodic price

spikes. Bird Island's storage capacity is a benefit for processors, too, Serbus adds. "We can put 120 semi-loads of beans on the floor and have them ready to go to the canners at a moment's notice."

At the same time, though, Bird Island Bean Company faces strong competition from larger handlers in the Red River Valley, says Nate Hultgren, the company's financial officer. And industry trends are adding to the competitive pressure. Demand for navy beans — used mainly in canned baked beans — is stagnant at about six million hundredweight a year. Meanwhile, surplus domestic stocks and foreign imports tend to weigh on navy bean prices, which are not supported by federal farm subsidies.

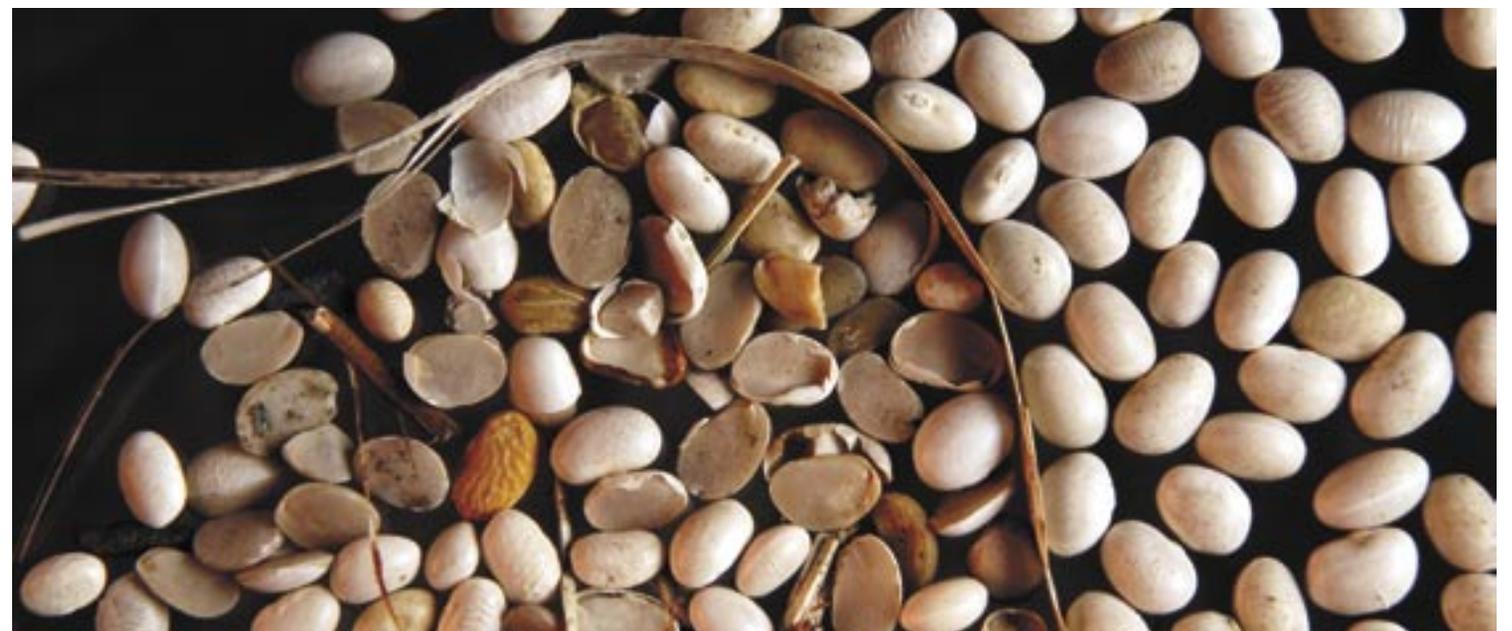
All these pressures led Bird Island Bean to AURI, seeking ideas about how to boost demand for navy beans.

#### Culling ideas

The company was especially interested in finding new outlets for broken or damaged beans, which amount to about five percent of annual production. Culls are unsuitable for canning and are usually sold as livestock feed, bringing \$40 to \$60 a ton. "Culls were the first area we looked at to bring in more revenue," Hultgren says.

Al Doering, technical service specialist at AURI's Waseca coproducts lab, helped Hultgren investigate a variety of potential manufacturing uses for culls. "We looked at all kinds of things, from adhesives and absorbents to pellet fuels for home heating stoves," Doering says.

Pellet fuels appear to be one of the most promising new uses for navy bean culls, Doering and Hultgren say. Dry beans produce a lot of heat energy with relatively low amounts of ash, according to a 2002 AURI study, which calculated the heat values of dozens of ag-based fuels, including navy beans. "Dry edible beans looked very good" as a biomass fuel, Doering says, "comparable to



On the right are dry navy beans ready for canning and at left are "culls," beans damaged during processing, which are usually sold as livestock feed. Bean growers are investigating more lucrative markets for culls, such as pellet fuels.

corn.” (A complete list of Btu comparisons is available at [www.auri.org](http://www.auri.org))

Demand for pellet fuels has more than doubled in the last five years, to about 680,000 tons a year, according to the Pellet Fuels Institute. Most pellet fuels are made from waste wood or sawdust, but there is growing interest in using other renewable fuel sources, too, Doering says. AURI is now working with a half-dozen Minnesota companies to commercialize pellet fuels made from the state’s ample supplies of beet pulp, distillers dried grain and other low-cost ag coproducts.

### ‘Bean-y’ taste a challenge

In addition to industrial uses, AURI also helped Bird Island Bean Company take a preliminary look at potential new food uses for navy beans.

These small white beans pack a whole lot of nutrition, offering high protein and low fat, plus plenty of fiber, folic acid and calcium. Navy beans could someday find their way into high-protein extruded snacks or breakfast foods, says AURI cereal scientist Charan Wadhawan. They could also be separated into components to make protein and starch concentrates for processed products such as baby food and bread. Nutraceutical opportunities are discussed in a 2003 AURI report on functional traits in Minnesota grains. (See accompanying story, page 5)

But Wadhawan notes that dry beans present two big challenges for food makers: a distinct “bean-y” flavor or smell and a tendency to produce flatulence.

“We’re probably years away from new bean products,” says Nate Hultgren, 26, who has a degree in finance from the University of Minnesota and raises sugar beets, corn, soybeans and navy beans in Kandiyohi County with his father, Duane. But Bird Island Bean Company is looking towards the future, he says. “We’re trying to develop relationships now with people who want to try new things. We’re not limiting our thinking.”

### Finding the golden egg

Bird Island Bean’s efforts are just one example of an industry-wide surge of interest in new uses for dry beans, says Tim Courneyea of Northarvest Bean Growers Association, based in Frazee, Minn. The commodity group represents dry bean producers in Minnesota and North Dakota. The two states lead the nation in the production of pinto, navy and dark red kidney beans.

In the 1970s, when the region first began expanding dry bean production, the industry funded research on separating beans into components for use in flour, pasta and other food products, says Courneyea, who has been with Northarvest since 1976. Those early efforts at adding value foundered, he says, partly because dry beans were too expensive.

As acreage and productivity rose in the 1980s and 1990s, commodity prices fell sharply, spurring renewed efforts to lift demand. “Five years ago, there was very little going on,” Courneyea says. “But now, everybody is looking at the health and nutritional benefits

of dry beans and exploring alternative ways of using them.”

Taking a cue from American corn growers, who have charted a national vision for a carbohydrate economy based on corn, Northarvest growers are developing a similar vision for the dry bean industry, Courneyea says.

Over the next year, for example, the association will hold conferences on the most promising ways to use dry beans in health foods, pharmaceutical products and industrial goods. These conferences are the first step in creating a long-range plan to guide research, new product development and promotion. Courneyea says, “We need to have an appropriate agenda showing where we’d like to go.” ■



Left to right: Larry Serbus and Willmar-area navy bean growers Curt Meyer, Duane Hultgren and Nate Hultgren bought a closed ag processing plant and started the Bird Island Bean Company, which buys, cleans and ships navy beans for about 250 producers.



Central Minnesota is one of the country’s top-producing regions for navy beans, used primarily in canned baked beans.

## Elsewhere in ag utilization

BY DAN LEMKE AND JENNIFER PENA  
CARTOON © UNCLE HYGGLY

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

### Flat beer fuel

A group of Ohio investors wants to convert sugary syrups and other waste liquids into fuel. They are building an ethanol plant near Akron that will use raw materials such as flat beer and soda from beverage manufacturers. Company investors hope to begin production by the end of the year.

Source: Akron Beacon Journal, July 9, 2003

### Brain-boosting blues

Trying to entice people to eat more blueberries, University of Maine researchers are whipping up new recipes that combine wild blueberries with other healthy products, such as soy. The researchers' efforts have yielded some offbeat concoctions such as "berry burgers," precooked beef or chicken patties mixed with blueberry puree to improve taste after reheating.

Besides capitalizing on various blueberry uses, the industry is touting the fruit's health benefits. A USDA study suggests blueberries may reverse age-related short-term memory loss and help restore some balance and coordination.

Source: ProgressiveFarmer.com

### Space-age grapes

Satellites are helping Europe's wine industry design the perfect vintage.

European Space Agency craft are beaming back images of vineyards that, with unprecedented detail, provide vital information about the area's conditions, such as slope, soil type and humidity. Growers could analyze how geology affects the grapes' distinct flavor. The satellites may also monitor grapes' color and shape as they grow and help farmers determine the optimal harvest time.

Source: BBC News, July 17, 2003

### Cancer-halting genistein

A soy extract may help slow the progress of prostate cancer, according to University of California Davis Cancer Center researchers. A study found that only 38 percent of men given genistein, a soy isoflavone, experienced a rise in prostate-specific antigen (PSA) levels, versus 98 percent in the untreated control group. PSA levels tend to rise when cancer causes the prostate gland to enlarge. Genistein may help men with prostate cancer, but researchers say more studies are needed.

Source: BBC News, May 1, 2003



### Corn cloth

DuPont has been honored for its innovative use of corn in clothing, carpets and automobile interiors. The U.S. Environmental Protection Agency presented its Presidential Green Chemistry award to Dupont in June.

Dupont engineered a microorganism to use corn sugars in a fermentation process to produce Sorona®, a polymer platform that can be used in textile apparel, carpeting and packaging. Not only does the new bio-based method employ renewable resources, it uses less energy and produces fewer emissions than traditional petrochemical processes.

Source: www.dupont.com July 24, 2003

### Record-busting ethanol

The U.S. ethanol industry set an all-time record in June by producing 181,000 barrels per day — 47 percent more than a year ago, according to the U.S. Energy Information Administration.

The ethanol industry is expected to produce more than 2.7 billion gallons in 2003, up from a record annual production of 2.13 billion gallons in 2002. Currently, 73 ethanol plants have the capacity to produce over 2.9 billion gallons annually. Thirteen ethanol plants are under construction.

Source: www.ethanolrfa.org

### A Case for soy

Case IH, a leading farm equipment manufacturer, is using polyurethane plastic made from soybean derivatives for exterior trim panels on AFX Series combines. Over 370 pounds of the soy-based plastic are used on each harvester. Although 25 percent lighter weight than steel, the soy panels are extremely strong and similar to conventional polyurethane in quality. John Deere also uses soy-based panels in some implements.

Source: USB Biobased Solutions, July 2003

### Fertility vitamin discovery

Japanese scientists have discovered a vitamin that may play an important role in fertility.

A research team has confirmed that pyrroloquinoline quinone (PQQ), a substance discovered in 1979, can be categorized as a vitamin. Mice deprived of PQQ suffer reduced fertility and roughened fur. Vitamins' effects on mice are often similar to humans.

The best PQQ source identified so far is "natto," a pungent Japanese dish of fermented soybeans. Other foods rich in the vitamin include parsley, green tea, green peppers, kiwi fruit and papaya.

Source: Reuters, April 24, 2003 ■

## Ag on the Web

BY JENNIFER PENA

These days, we frequently have to "multi-task" several jobs at once. Now we expect that from our farm crops, too. The hottest food trend today is all about "function" — nutritional performance that goes beyond the basics to preventing and treating disease. We have found some interesting Web sites from around the globe that feature functional foods. Check out the latest on nutraceutical markets and research. And don't forget to visit [www.auri.org](http://www.auri.org) for more agricultural news and updates.

### Nutrition & Functional Foods Network

[www.foodlineweb.co.uk/functional/index.asp?user=](http://www.foodlineweb.co.uk/functional/index.asp?user=)

Located on Foodline.com's Web site, the Nutrition & Functional Foods Network provides valuable, up-to-date information on various functional foods topics. Launched from Great Britain, the site includes free sections for all browsers to access research updates and industry news, plus a news archive. Also, browsers can sign up for a free weekly functional-food news update. Network members receive even more benefits, such as two newsletters, new product development information and market statistics.

### New Hope

[www.newhope.com/ffn](http://www.newhope.com/ffn)

This site, designed for functional foods businesses, includes news on marketing, science and future trends. Businesses can sign-up online for a free subscription to Functional Foods & Nutraceuticals, an international publication with in-depth news and analysis, business and marketing trends, product and ingredient information, and the latest scientific research.

### Prepared Foods

[www.preparedfoods.com/browse/subject/functional.asp](http://www.preparedfoods.com/browse/subject/functional.asp)

If you want food news, check this out. Prepared Foods' searchable site includes a section devoted to functional foods, complete with news features, new products, briefs and statistics. Search for information on a range of agricultural topics, sign up for a free subscription to the Prepared Foods publication, or link to industry resources.

### Nutraceutical & Functional Food Buyer's Guide 2003

<http://209.242.196.12/nutra/index.html>

The Institute of Foods Technologists ([www.ift.com](http://www.ift.com)) has an online version of the Nutraceutical & Functional Food Buyer's Guide for 2003. More than 100 companies provide functional food ingredients in 16 categories. Browsers can search through this helpful supplier database by category or company name.

### Nutraceuticals World

[www.nutraceuticalsworld.com/index.htm](http://www.nutraceuticalsworld.com/index.htm)

This site is a companion to the Nutraceuticals World magazine, which publishes 10 issues per year. It features manufacturers of dietary supplements, functional foods and nutritional beverages. The magazine covers national trends, new technologies, product and market sourcing, and trade show information. The Web site is filled with resources, including company profiles, product and service literature, a guide to Web resources and more. A free subscription to Nutraceuticals World and a helpful media and advertising guide is available to qualifying readers from the nutraceuticals industry.

### Functional Foods and Drinks Information Sheet

[www.ifr.bbsrc.ac.uk/Public/FoodInfoSheets/funcfoods.html](http://www.ifr.bbsrc.ac.uk/Public/FoodInfoSheets/funcfoods.html)

If you are hungry for information, but don't have much time, this research sheet is the fast-functional-food stop that will satisfy your appetite. Sourced from the Institute of Food Research, it includes functional food basics — what they are, where they are found in the marketplace, regulations and the validity of claims. This is a great resource for those who want a quick, simple read. ■

# Dressing for success

## Former restaurant owners are commercializing potato and pasta salad dressings

BY JENNIFER PENA

Granite Falls, Minn. — In the convenience-food age, Karen Henning says consumers still have only two options for putting potato salad on the dinner table — make it from scratch or buy it ready made. There are no quick-fix alternatives. "You can't go into a store and buy a jar of potato salad dressing," Henning says.

Seeing an opening in the market, Karen and husband Doug are marketing their own brand of sweet, tangy dressings. This fall, Cedar Valley Foods dressings will be available at several grocery and retail stores in west central Minnesota. Along with the usual ingredients — soybean oil, eggs, sugar, vinegar — Hennings' dressings are made with a secret formula "of this and that," Karen says.

Karen developed the dressing recipes by making thousands of pounds of potato and pasta salad every year for Doug's Cafe and catering business in Renville, Minn., which they purchased in 1975 and sold in 1990.

### Serious about salad

Karen came upon her hit creation by trying different combinations of ingredients and seasonings until the salads became so popular that customers started ordering them by the gallon to take home. Some suggested the Hennings sell dressings that customers could mix with their own potatoes and pasta at home. The idea simmered for years as both Doug and Karen pursued other opportunities. Doug is now an American Family Insurance agent and Karen works for the Jennie-O Turkey Store in Montevideo, Minn. About four years ago they decided to take their recipe more seriously.



The Hennings invested in a marketing study and worked with AURI on feasibility and nutritional labeling. The Small Business Development Center in Marshall, Minn. helped with business development and financing. The Hennings then formed a new company: Cedar Valley Foods. Bottling the products in their own kitchen, Doug and Karen began giving out samples at tradeshows and special events.

"Taste is still consumers' number one criteria," says Charan Wadhawn, AURI food scientist who has assisted Cedar Valley. "I believe this product has passed the taste test of thousands."

In 2001, the Hennings served 500 pounds of salad at the Women's Expo in Willmar. "There were 3,000 to 4,000 women there and they thought the dressing was great," Doug said. "It was then that we decided to get the dressing in jars."

They also gave out product samples at the 2003 Minnesota Inventor's Congress in

Redwood Falls. Almost everyone who tried it was impressed, Doug Henning said. "One little girl came back half a dozen times." Many requested to purchase the dressings, although they were not yet commercially available.

### To the bright lights

This summer, a friend suggested they compete in the Million Dollar Idea show on KSTC Channel

45, a Twin Cities cable television station. Karen auditioned with a videotape of her demonstrating "Karen's Recipes" dressings in an Edina mall. She was selected to be one of 62 contestants appearing in the show's eight weekly episodes. Karen moved up to the final round of the contest but didn't win the grand prize — a \$40,000 package of business services. However, the Hennings gained exposure and experience.

They contracted with a specialty food processor in Indianapolis to make the dressings; the first batch was shipped to Klein Foods in Marshall for bottling in late August. The bottled dressings will be in local stores this fall. In September, they presented samples of Karen's Recipes at the Chef's Medley Show in Willmar.

The Hennings are confident their business will succeed — with a large support group to lean on: "There are a lot of friends and family, plus eight newspapers, four radio stations ... our local support," says Doug who served



Karen and Doug Henning are marketing their own brand of sweet, tangy dressings — taste-tested through their former catering business.

a combined 10 years on the Renville City Council and as mayor.

Within two to three years, the Hennings want their products in major retail stores. They also hope to eventually construct their own bottling plant. But for now, they are focused on attracting customers. Doug says people who have tried the dressings are persistently asking where they can buy it, "so it's time to get it in the stores." ■



## Innovative products on display at FarmFest

PHOTOS BY DAN LEMKE

AURI staff and clients showcased ag innovations at the 2003 Farm Fest August 5-7 at Gilfillian Estates near Redwood Falls. Clients displayed alfalfa-based feed supplements made by RK Marketing Enterprises of Waconia and all-natural, organic soy-based fertilizers by Renaissance Fertilizers of Edina, and visitors sampled Aunt Cookie's Red Rhubarb Spread.

Pictured at left is a new addition to AURI's display: a Minnesota Products to table where visitors could purchase or receive information on such products as Harvest Delight popcorn, Suet Plus bird seed cakes, and SoySoft lotions and soaps.

At right, U.S. Congressman Mark Kennedy talks to Westbrook-Walnut Grove High School teacher Lynn Arndt about student-run BOLT Enterprises, which markets Prairie Smoke barbecue sauce as an educational business project.





## A winning formula

Producers plan to follow corn-ethanol success with high-value soy

BY DAN LEMKE

*Glennville, Minn.* — So much for the lazy days of summer. During June and July, farmer-members of the SoyMor cooperative hustled to raise \$6 million for a biorefinery that will fractionate soybeans into high-value nutritional ingredients.

The equity drive among SoyMor's 500 southern Minnesota members culminates four years of planning, feasibility studies and plant design work. Board members expect a new plant will be up and operating in about a year.

### Not so green this time

About half of SoyMor's members are already experienced in value-added processing. They also belong to EXOL Agra Resources, a cooperative that started operating a corn-ethanol plant near Glennville in March 1999.

"The same group working on corn wanted to do beans, too," says SoyMor President Roger Peterson. The producers planned SoyMor as a sister site to the EXOL plant.

SoyMor's processing methods are unlike any other in the United States, Peterson says. Using advanced technology, SoyMor will process raw lecithin, a soybean component, into high-value, nutraceutical ingredients without using toxic chemicals. Lecithin will be refined into phospholipids like phosphatidylcholine and phosphatidylserine, which have been shown to lower cholesterol and improve the immune system and brain performance.

"This is an excellent example of high-tech, value-added processing," says Max Norris, AURI scientist in Marshall. "They are utilizing cutting-edge technology to go after a high-value market."

But honing in on the high-potential opportunity was no small feat.

### What works?

In 2000 and again in 2001, SoyMor's members committed funds to study the feasibility of value-added opportunities. AURI lent technology development support and funds because of the project's uniqueness and potential to impact many producers.

After evaluating several soy-processing ideas, the cooperative chose a unique process for manufacturing high-value isolates from soybeans. SoyMor then filed several provisional patents on the process, developed with Thar Technologies of Pittsburgh, Pa.

Most extraction processes use chemicals such as hexane. But SoyMor uses captured carbon dioxide from the nearby EXOL plant and a high-pressure process to separate purified lecithin components. No chemicals are used.

### Fuel is up next

Although the process is complicated, the goal is simple: "We are all anxious to have a project that will add value to our soybeans," says Gary Pestorius, SoyMor and EXOL board member.

Recognizing that the entire process, from planning to operations, can take years, "it's better if people don't know how hard it is," Pestorius says. However, "in this case we knew and still did it."

Peterson says the biorefinery is the first phase of SoyMor's plan. Biodiesel production, which AURI is helping the co-op plan, will be the second phase. SoyMor then plans to construct a facility to crush raw soybeans into meal and oil.

Jerry Janzig, an EXOL and SoyMor board member who farms near Alden, says the reason for all the work is simple. "Just like with the corn, we're trying to keep profits here instead of shipping it all off." ■