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Raising sheep for science



Canton flock helps in medical research

By Randy Hascall
Sioux Falls Business Journal

CANTON – The 250 sheep grazing in a hilly pasture north of Canton look like any other flock.

But these sheep are special. They're being raised for biomedical research – to develop a medicine for Alzheimer's patients, to assist in the study of fetal development, to provide heart valves for human patients.

See **SHEEP**, page 14

► More about
the flock,
page 15

ABOVE: Jerry
Pommer gives
dewormer to one
of his sheep.

Greg Undeen
For the Business Journal

East-side developers ask city to annex land

By Rob Swenson
Sioux Falls Business Journal

The eastern fringe of Sioux Falls is gaining hundreds of acres as commercial and residential developers position themselves to take advantage of coming water, sewer and street improvements.

A package of four requests that totals approximately 670 acres likely will be the next chunk added to the city limits.

The package is comprised of Willow Run Golf Course, two development parcels owned by PariPassu Cos. of Minneapolis and a 40-acre tract owned by Sioux Falls businessman Tom Hein.

Dr. Dick Tschetter, majority owner of Willow Run, said PariPassu had asked if the golf course wanted to join the request for annexation, and he decided the time was right.

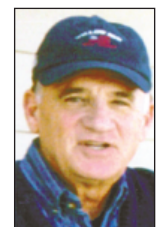
"There's more upside than downside," Tschetter said.

The downside might be higher property taxes, he said. The upside will include the addition of city services that will make 25 to 30 acres of undeveloped residential property along the golf course more attractive, Tschetter said.

"The east side is just really going to boom," Tschetter said. "To me, the east side is the prettiest terrain in Sioux Falls."

PariPassu, which has land both east and west of Willow Run, plans to develop 450 acres of that rolling east-side turf.

The largest portion of the company's tract, which borders Willow Run



**Dick
Tschetter**

► Map of
affected
areas,
page 21

See **ANNEX**, page 21

SHEEP: Extensive flock management

Continued from page 1

Area producer Jerry Pommer is hopeful his sheep will lead scientists to a medical breakthrough, that his animals might help make life better for people with diseases or deteriorating organs.

"That's kind of what drives you," he said.

Pommer has been raising sheep for research since 1991 and provides about 100 head a year for that purpose. His production facility is named Ovis, a Latin word that means sheep.

The woolly animals are popular in the research field for a variety of reasons. First of all, their size and structure is more similar to the human body than many animals'.

Pommer raises Cheviot sheep because that breed is hardier and smaller than some breeds.

"If they're too big, they don't fit on the operating table," he said. "They're a very hardy breed and recover better from surgery."

Pommer takes several steps and precautions to ensure his flock isn't infected by commonly carried pathogens found in many normal sheep flocks. Those pathogens could interfere with research results, affect researchers' health and alter a sheep's ability to produce a safe, high-quality biological product.

The process involves collecting blood samples from each of the animals and sending them to a diagnostic lab to test for a variety of diseases.

The sheep are vaccinated and wear identification tags on their ears so Pommer can keep accurate and extensive records. Those include genealogy records showing which ewe was bred with which ram. Pommer collects semen from rams off-site and artificially inseminates his ewes. He said he's a firm believer in animal welfare and providing the best conditions possible.

The sheep are used by scientists, doctors and researchers in at least eight states.

Targeting the spinal cord

At the Northern Biomedical Research laboratory in Muskegon, Mich., Bob Boyd and other staff members use the sheep for spinal cord and brain research of diseases such as Alzheimer's, Parkinson's, Lou Gehrig's and epilepsy.

Northern Biomedical works with pharmaceutical companies to develop drugs and technology that allow the treatment to go directly into a spinal column or brain.

Among the advantages of using sheep for research are that their spinal cords are about the same length as humans', the animals are small enough to place in a magnetic resonance imaging machine, and surgical



Greg Undeen | For the Sioux Falls Business Journal

Jerry Pommer watches a lamb and its mother in the pasture at the Ovis farm north of Canton. Pommer has a herd of 250 sheep that he is raising for the medical research market. He keeps extensive records and takes several steps to ensure that the sheep are healthy.

procedures on sheep are similar to those used on people.

It's difficult to find good sheep in Michigan because of long, wet spring seasons and a problem with a deer disease that contaminates sheep, Boyd said. When a project requires the use of sheep, the lab will order about 60 from Pommer.

"People are surprised when we have to go all the way to South Dakota for clean (healthy) sheep," he said in a phone interview. "I have been out there and looked over his facilities, so we know who we're buying from. We spend a lot of money on animals."

Pommer prefers to keep his prices private but said the sheep sell for "a lot more" than they would at market.

"Worth the price"

Boyd said researchers go to extremes to locate and maintain a healthy source of test animals, and corners can't be cut when it comes to proper research.

"The sheep are worth the price if they're clean," he said. "Research is always slow, but having appropriate animals is important."

Northern Biomedical pays about \$5,000 each for monkeys, which also are used for research.

All animals "get treated very, very

well" and are housed in air-conditioned buildings with large rooms, Boyd said. The lab tests new drugs on sheep or other animals and reports its data to the Food and Drug Administration. If tests are successful, that opens the door to experimental use by people – patients with Lou Gehrig's disease, for example. And that can lead to FDA approval of a new drug.

Some researchers and doctors are reluctant to talk about their work. A doctor at the Mayo Clinic declined an interview request. That facility uses sheep for heart-valve replacements, and bone and joint replacements.

Other institutions use the sheep for organ transplants and research projects on fetal surgery, blood products, medical devices for hearts and a drug used for miscarriages.

Sean Limesand, an assistant professor in the University of Arizona's department of animal sciences, spent five years at another university conducting fetal research on pregnant sheep supplied by Pommer.

Studies looked at such things as respiratory, heart and placental functions, insulation secretion and environmental heat stress.

"A sheep really lends itself to these types of studies," said Limesand,

whose team studied only young ewes that were pregnant with a single fetus.

Antibody production

Many animals have to be anesthetized to be studied, but not sheep, said Limesand, a native of Luverne, Minn. Researchers can insert a catheter and sample blood as it's circulating while a sheep is in its normal state. Another benefit in pregnant sheep is that they have less violent contractions than monkeys do.

In Sioux Falls, Pommer's sheep are used by Hematech Inc., a biotechnology company that focuses on developing new human therapeutics in transgenic cattle. Pommer also works at Hematech.

The company uses the sheep to produce specific antibodies that are important reagents for detecting and monitoring immunoglobulins and viruses that will be removed during the manufacturing of human antibody products. Immunoglobulins are special proteins made by the body's immune system as a defense against foreign materials.

Because of their large bodies, sheep can produce a much larger quantity of antibodies than rabbits or mice can.

See **FLOCK**, page 15

Sheep's anatomy, physiology make them ideal for research

By **Randy Hascall**
Sioux Falls Business Journal

A little more than 15 years ago, South Dakota native Jerry Pommer launched a program in response to a growing demand for research in the biomedical and agricultural science fields.

Today, Ovis is a federally licensed sheep production facility that specializes in producing sheep that are suited to meet the needs of doctors and researchers.

The flock is developed and maintained so the sheep aren't infected by commonly carried pathogens that can be found in most normal flocks.

That takes "a lot of management," Pommer said.

His Cheviot-breed sheep are known for their hardiness, disease resistance and smaller size. Adult males weigh 160 to 180 pounds. Adult females weigh 140 to 160 pounds.

Ovis provides male and female sheep of various ages, including pregnant ones.

Sean Limesand, a University of Arizona assistant professor who conducted sheep research when he worked for another university, said the pregnant Ovis ewes were ideal for fetal research. The studies focused on younger ewes with single fetuses, not twins.

The herd is used in human research studies in addition to studies of sheep diseases, treatments, reproduction and nutrition. Here are some examples:

- **Experimental surgery research.** The sheep's size is convenient and similar to humans. Ovis has provided sheep for surgical research in cardiovascular, neurological and organ transplantation fields.

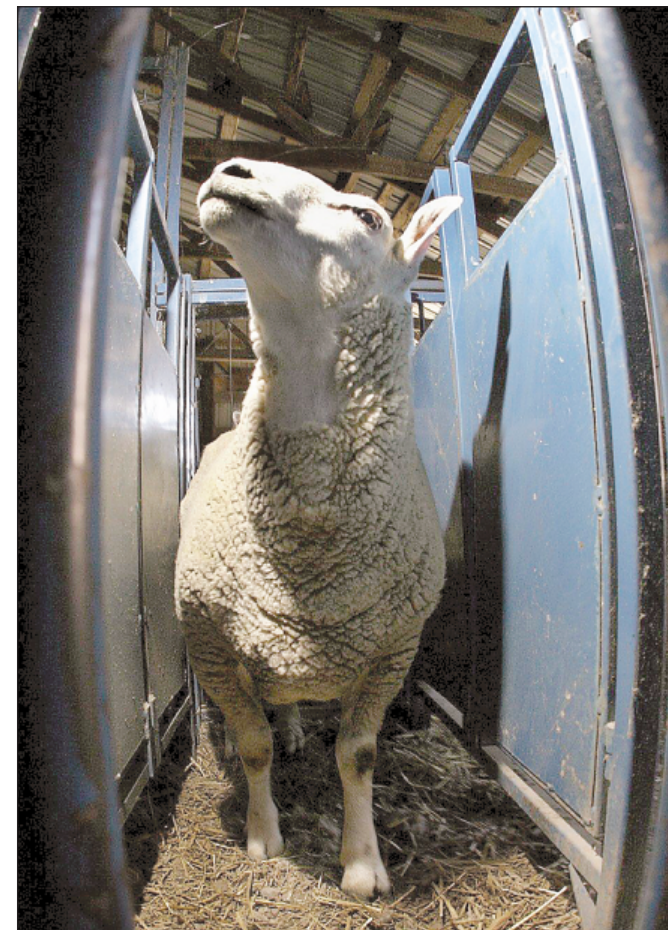
- **Fetal research.** Pregnant sheep and their fetuses provide a close model for human pregnancy and are studied to provide insight into conditions that affect human development before birth.

- **Biomedical device research.** Sheep are being used to research joint replacements, implanted drug-delivery devices and cardiac shunts.

- **Blood products.** The flock can provide a source of blood products such as normal and hyperimmune serum and plasma, and whole blood.

The sheep are being used for biomedical purposes at Hematech Inc. in Sioux Falls; Northern Biomedical Research in Muskegon, Mich.; the Mayo Clinic in Rochester, Minn.; and institutions in five other states.

Agricultural science research is being conducted by the South Dakota State University veterinary science department in Brookings and at the National Animal Disease Center in Ames, Iowa.



Photos by **Greg Undeen** | For the Sioux Falls Business Journal
The sheep raised by Jerry Pommer are Cheviots, which are known for their hardiness, disease resistance and smaller size.

FLOCK: Most research farms on coasts

Continued from page 14

"Sheep are a very useful tool to a lot of research," said Jin-an Jiao, senior vice president of product development and manufacturing at Hematech. "It's good to have research tools so close."

Because bacteria become resistant to antibiotics, Hematech strives to develop new human, polyclonal antibody-based therapeutics to fight the bacteria. Polyclonal means that multiple antibodies bind to multiple foreign materials to destroy them and prevent diseases.

Sheep are vaccinated with a bovine antigen and, in turn, generate specific antibodies against that antigen. Researchers collect that antibody as a plasma or serum and can preserve it for several years for use in research, Jiao said.

Testing for animal disease

Research on Pommer's sheep isn't limited to medical advancements in human treatments. The animals also are being used by the South Dakota State University veterinary science department at Brookings and the National Animal Disease Center at Ames, Iowa, to do research on scrapie and chronic wasting disease.

THE POMMER FILE

Name: Jerry Pommer
Occupation: Works at Hematech Inc.; also operates Ovis, a research-sheep production facility north of Canton. Ovis is a Latin word meaning sheep.
Age: 51
Family: Wife and two children
Background: Grew up at Willow Lake, graduated from Willow Lake High School. Earned a bachelor's degree in microbiology and biology from South Dakota State University and a master's degree in veterinary science from North Dakota State University. His thesis was on sheep respiratory diseases.
Ovis Web site: www.ovissheep.com

LEFT: Jerry Pommer also works at Hematech, one of the firms that use his sheep in research.

Pommer annually supplies SDSU with a half-dozen sheep that are bred to be genetically susceptible to scrapie, a degenerative nervous disease that affects the animals. Researchers infect the sheep with the disease so they can study them for diagnostic purposes.

Pommer said it takes these special

sheep 18 months to two years to develop the disease, whereas it could take five years for normal sheep.

"That saves a lot of time and money," he said.

Alan Young, an SDSU researcher, said the goal is to develop a live-animal test for scrapie and chronic wast-

ing disease. Current tests to diagnose the diseases can be done only on dead animals.

"It's convenient for us being this close to Jerry," Young said. "It's been very fortunate for us having his sheep there."

Pommer has received inquiries from as far away as Florida, Canada and Puerto Rico, but high transportation costs have discouraged those researchers from buying his animals.

He said no one else in the Midwest is producing sheep for these types of research. Most similar flocks are on the East and West coasts.

Pommer's flock suffered a major setback in 1999 when a neighbor's Doberman pinschers attacked. Thirty ewes and lambs were killed or had to be destroyed because of serious injuries. Others suffered from stress-related syndrome, mastitis or injuries that weren't life-threatening. Some had to be culled to strengthen the flock.

Because there's no replacement stock for the specialty sheep, it took several years to build the flock back up. Things eventually returned to normal, and today the ewes and frolicking lambs graze on 45 acres of prime pastureland.

They look just like any other sheep, but Pommer knows they're special, and he's hoping they'll lead to a medical breakthrough one day.