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Farm and Home Research

South Dakota State University Agricultural  
Experiment Station

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## Farm and Home Research: 51-2

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# Farm & Home RESEARCH

South Dakota State University • College of Agriculture & Biological Sciences • Agricultural Experiment Station

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## Leafy Spurge: NO SILVER BULLET

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Virtual learning center 'is not a place where you just sit back and take notes—you're thinking for yourself and working with other people'

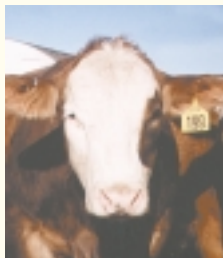
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**On the cover:**

Leafy spurge on rangeland resists "one-shot" approaches to control. A mix that includes herbicides, grazing, and flea beetles is more likely to be effective.

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Holistic approach—teaming up to pool resources—  
produces greatest benefits for ag producers

# Director's comments

by Kevin Kephart

Many people know that one of my passions is studying agricultural history, especially South Dakota's agricultural history. Last year, *Farm & Home Research* featured an article on N.E. Hansen, USDA's first agricultural explorer and Professor of Horticulture at the South Dakota Agricultural Experiment Station. One of the prizes of Hansen's 1897-98 expedition to Russia was a 12-ton shipment home of smooth brome grass seed.

Did he laboriously traverse the Russian steppes, skillfully selecting 12 tons of brome grass specimens? Unfortunately, no. He purchased all the smooth brome grass seed he could lay his hands on from local residents. This was hardly a discriminating collection of grass seed.

In some circles today, this shortcut to plant collection has given him a bad reputation. He can be accused of introducing leafy spurge to the Great Plains.

It is very possibly true that spurge seeds came as stowaways in the brome grass seed. Inspection of "plant immigrants" and seed cleaning certainly were not routine at the end of the 19th century. We will never know for sure how leafy spurge came to the Plains, but we do know that it was already in the U.S., for it had

been documented in Massachusetts in 1827.

If Hansen's shipment did contain contaminants, it is a classic case of having to take the bad along with the good: a valuable cool-season pasture grass that would help us endure the Dustbowl era and a troublesome weed that would become "the toughest noxious weed in South Dakota."

Today, scientists from the Agricultural Experiment Station, the Cooperative Extension Service, and the USDA Agricultural Research Service are developing a TEAM Spurge approach to controlling the weed. This holistic approach uses herbicides, grazing, mechanical, and biological control measures in concert. I have no doubt that progress in control of this weed will result.

Experiment Station scientists have formed teams to conduct other holistic research projects. The calf value discovery (CVD) project is one of our best examples where teams of scientists and extension specialists work directly with cow/calf producers, feeders, and veterinary practitioners. Ultimately, the CVD project will assist beef producers to consistently produce a high-quality carcass that captures greater financial returns. My hope is that this is one more step in enhancing



Kephart, r, at Agronomy Farm field tour.

and stabilizing the beef industry in South Dakota.

Without doubt, the sheep and pork industries also need new ideas. The U.S. sheep industry and its customers would both benefit if meat availability could be better synchronized with market demand. Through genetics and flock management, Dr. Lowell Slyter has made significant progress in making fall lambing a reality. This is surely a first step to year-round lambing, higher incomes for producers and local processors, and a greater variety of cuts in the store meat cases.

For pork, we have been evaluating the use of low-cost structures, such as hoop buildings, for feeding pigs. Yes, hoop barns can be an effective way to lower overhead costs for small-scale swine operations; however, feeders need to be aware of impacts on animal performance and carcass quality. The final data are not in, but we suspect a mild winter probably reduced utility costs in the conventional barns.

Articles in *Farm & Home Research* often result in letters, e-mails, and comments coming to my office. I enjoy hearing from all our readers. Please feel free to share your thoughts with me. □



Calf Value Discovery Program enables cow/calf producers to improve their products

# ‘From pasture to plate’

by Nancy Grathwohl

**C**attle producers are hearing a wake-up call. Consumers are no longer willing to settle for tough, low-quality products. They want a quality eating experience every time.

Over the last 20 years, inconsistency in beef palatability has led to a decline in beef consumption. That filters back to reduced market share for the beef producer. This economic loss has made it necessary for producers to improve the quality and consistency of their end product—and their bottom line on the ledger sheet.

SDSU’s Calf Value Discovery (CVD) program gives producers an opportunity to evaluate all aspects of their operations—literally from pasture to plate. CVD is a feedlot performance and carcass data collection program that enables producers to analyze their management strategies, herd health programs, and genetics.

“The program’s main objective is to get cow-calf producers to retrieve data on their cattle,” said Brad Johnson, extension beef feedlot and ruminant nutrition specialist in charge of the CVD project.

The CVD program does not just focus on how calves perform after weaning. All management factors that occurred to the calf from birth to its arrival at the feedlot and while it is being finished out in the feedlot affect quality. For this reason, participants in the program complete a survey when they enroll their calves in the program. Questions cover management at the ranch of origin, including vaccinations, castration date and method, preweaning schedule, and creep feeding.

“We’re finding many factors affect the carcass on the rail,” Johnson

said. "If we want an acceptable carcass at the end, we have to realize there are a lot of things that happen on the ranch of origin that can impact that."

**W**hen the calves arrive at the feedlot, blood is drawn to test for bovine viral diarrhea and bovine respiratory syncytial virus titers.

Some cattle previously thought to have received vaccinations for these diseases have low titers, Johnson said.

"Producers are always being bombarded with 'use this vaccine or that vaccine.' Pulling blood samples and looking at titer levels can show producers which medications are effective for their particular operations."

Titer levels also may indicate whether an animal is going to become sick in the feedlot.

"We look at the different kinds of vaccination programs used on the ranch and how they affect the health of the calves when they get to the feed yard," said Doug Zalesky, former extension beef specialist at the West River Ag Center in Rapid City. *(cont. p. 5)*

## The 1998-99 CVD Program

On November 2, 1998, 558 calves from 61 producers and representing a range of genetics were placed on feed at two locations, Bruce and Vale. Upon arrival, steers were vaccinated, eartagged, and weighed and blood was drawn to test for titers.

All steers were fed in the same pen, implanted, and placed on an accelerated finishing program. They were marketed on a carcass basis when they reached acceptable weight and finish standards. All carcass and performance information was returned to the producer along with a financial summary.

### In weight (weight upon arrival)

590 lb average, 112 lb standard deviation

### Out weight (weight at harvest, with 4% shrink)

1164 lb, 121 lb standard deviation

### Average daily gain

Bruce: 3.05 lb/day, range 1.34-4.39 lb/day  
94% of steers gained more than 2.51 lb/day

Vale: 3.06 lb/day, range 1.34-4.85 lb/day  
65% of steers gained more than 2.51 lb/day

### Total cost of gain/cwt

Bruce: \$41.33 average, range \$34.67-\$77.51

Vale: \$47.29 average, range \$34.15-\$94.60

### Feed cost (total dollars of feed/steer, differences are due to corn prices)

Bruce: \$174.97 average, range \$121.27-\$250.96

Vale: \$204.46 average, range \$107.65-\$308.67

### USDA yield grades

yield grade 2.6 average

70% of carcasses yielded 1 or 2

### USDA quality grades

choice or higher: 34%

select: 56.2%

standard: 9.7%

### Warner-Bratzler shear force

tender: 40.3% of steaks (<3.5 kg to shear)

medium: 51% of steaks (3.5-5 kg to shear)

tough: 8.7% of steaks (>5 kg to shear)

Lower (tender) shear force values usually indicate higher marbling scores. There was a poor relationship between tenderness and marbling for these carcasses; thus, it is possible to have tender cattle that are not highly marbled.

### 12th rib fat thickness

0.41 inch average, range 0.1-1.1 inches backfat

46% of carcasses were within range of 0.26-0.45 inch external fat

Fat thickness is an important measure, as it is inversely related to retail yield.

### Animal treatment cost by owner

< \$5.00, 73% of owners

> \$11.00, 6.5% of owners

### Lung lesions

55 of 280 calf feds (newly weaned calves on accelerated finishing program for 180-200 days) had lung lesions at slaughter, indicating prior pneumonia and liver abscesses.

**For more information, ask for  
EC 910, Calf Value Discovery Program,  
at your local extension office.**

## “Shipping fever” studies in the CVD program

Cattle consigned to SDSU's calf value discovery program are pulling double duty. Along with feedlot and carcass data returned back to the producer, scientists in SDSU's Veterinary Science and Animal and Range Sciences departments are collecting information to better understand Bovine Respiratory Disease (BRD).

Classically, the disease is a problem with cattle that have been transported or moved; thus, it is dubbed shipping fever. It usually occurs within the first 4 weeks after moving due to stress, said Bill Epperson, extension veterinarian at SDSU.

The afflicted animal must be separated from the group for treatment, adding to the cost of decreased average daily gain, feed efficiency, and overall economic value. BRD is considered the most costly disease in the beef cattle industry, he said.

“Many feedlot operators will tell you, 'If you have to treat a calf, then you've lost all the profit in that calf.' That's very clearly the case if you consider just the medicine cost. In fact, they've probably lost a lot more than just the profit off that one calf,” commented Epperson.

Cattle feeders estimate a \$20 per head profit on fed cattle over the long run. It's not uncommon for BRD medicine to cost between \$15 and \$35 per animal. On average, between 10 and 20 percent of cattle entering a feedlot are affected with the disease, he said.

Besides being a very costly disease, BRD also may be more prevalent in cattle than was previously thought. A sub-clinical form of shipping fever may exist where cattle go through a very mild bout of the disease, are not identified as ill, yet have inflamed lungs at harvest.

“We have to think not just about treatment of the disease but about prevention, which potentially brings us back to the ranch of origin,” he said.

According to the scientists' limited data, cattle with lung lesions do tend to have decreased average daily gain and they grade poorer.

“Other investigators also have found there's a tendency for cattle with lung lesions at slaughter to have decreased performance. We're really happy that our results agree with other investigators even though our numbers aren't very big,” said Epperson.

Last year, approximately 450 calves coming from 50 different owners that, in turn, had 17 different vaccination programs passed through the Calf Value Discovery Program. Epperson estimates it will take 5 to 8 or more years to amass enough data to make some defi-

nite associations between health and vaccination or management programs.

Epperson terms this work a “life-cycle approach.” He hopes to determine lifetime productivity or risk factors that occur in an animal's lifetime that will lead to performance or non-performance.

He said three elements dictate performance: genetics, feed/feed management, and health. Scientists have a good grasp on feed management and understand genetics better every day, but, from a lifetime health perspective, the health issue is poorly understood, he commented.

“The Calf Value Discovery Program offers a unique setting in that a small number of calves from many producers are put into a similar feedlot environment,” he said. “We harvest those animals and have all the data: prior health history, vaccination history, feedlot performance, and carcass data. In addition, we're allowed to examine all of the internal organs at the plant for evidence of abnormalities,” he said.

The objective is to look at ranch-of-origin impacts on feedlot health, performance, and calf value in an attempt to determine what programs might be important to implement at the ranch of origin, said Epperson.

Although the data is predominately generated from South Dakota cattle, Epperson doesn't believe the results would be limited to South Dakota. The scientists are also working with other feedlots in the area to obtain more data, he said.

Epperson and colleagues are analyzing another variable that may be associated with calf value: antibody concentration of important respiratory pathogens at feedlot arrival. They are also looking at trace minerals and at the possibility that trace minerals are important for incoming cattle. These are of major interest to producers, he said.

Respiratory disease is complex in that many bacteria and viruses may be involved. In fact, many of these bugs have a natural reservoir in the respiratory tract of cattle, he said. The right combination of environment and animal and agent triggers the disease, he said.

Epperson's study is focused on the environment and animal as contributors to the disease.

“People have looked at agents for 50 years and not solved the problem. I'm not sure we're going to solve the problem either, but our approach is different,” he said. “I feel comfortable with it because it's a practical management approach.”



**Feeders in the CVD program provide cow/calf producers the data that boost herd management and genetics programs, thus starting the trail of preferred meat products from pasture to plate.**

If there is a problem with herd health, William Epperson, DVM, another member of the CVD team, tries to work with the calf producer to find the cause. Epperson also observes the carcasses at slaughter for the evidence of lung lesions and liver abscesses.

After the steers are marketed, a steak is removed from the carcass for Warner-Bratzler Shear Force analysis to determine tenderness.

“It is very hard for commercial producers, even if they feed their own cattle, retain ownership, and sell on a value-based grid or through an alliance, to have any idea of tenderness. It’s fairly costly, and you have to take greater than a 1-inch steak off the carcass (to perform a tenderness test),” Johnson said.

All cattle in the CVD program are handled consistently. That rules out other factors and makes genetics the most obvious reason for the differences in tenderness among the carcasses, Johnson said.

The team is finding that carcasses with lung lesions are tougher than those with no lesions.

“Cattle with lung lesions tend to have decreased average daily gains, grade poorer, and have tougher meat,” Johnson said.

**A**ll the information collected in the CVD program is compiled and returned to the producers, enabling them to make wiser management decisions. Producers can use this information as an incentive to buyers representing feedlots.

“If producers can show that for the last 3 years, they’ve taken 10 head of calves to our program and maybe only one got sick, and they had no death loss—that’s important to the feedlot,” Johnson said.

Johnson is not advocating retained ownership. Producers can do what they want with the information when they sell their calves. “The auctioneer can say this is how a representative sample of this lot actually performed,” Johnson said.

“This program has really served the farmers and ranchers by giving them an opportunity to see if there was more money to be made by keeping their calves and feeding them,” Zalesky said.

**R**ich and Ed Blair run Blair Brothers Ranch north of Sturgis. They are past CVD participants who have put the information from the program to work in their operation.

“Through the CVD project, we learned whether we were better off to retain ownership of our cattle through the feeding period or sell them as calves,” Rich Blair

said. “The CVD project re-enforced our idea of selecting bulls with carcass data in mind.”

Besides using the data to make genetic improvement, Blair said the information also serves as a tool to increase profitability.

“In analyzing the data from one producer’s five head, it was not hard to find \$150-200 per head difference between those steers,” Blair said. “If you could cull the bottom steers and produce more of the valuable ones, it was obvious that you would be well compensated.”

Blair has sold bulls for the past 5 years, and he said that having carcass data on his calves has opened up new markets for them.

“I think cowboys need to get out of the cattle business and get into the steak business. They need to realize who their customers are,” Blair said. “If we can improve the quality and consistency of our product, it will improve overall beef demand.”

**“I think cowboys need to get out of the cattle business and get into the steak business.”**

*—Rich Blair, Blair Brothers Ranch, Sturgis*

This year’s project has 314 steers in the program, which is nearly self-supporting from entry fees. Scott Fausti, Economics Department, will derive an economic model from the results. Shear force tests were partially supported by a grant from the South Dakota Beef Industry Council, and a portion of salaries came from a USDA seed grant. For more information, contact Johnson at (605) 688-5442. □



A South Dakota premium product,  
shipped out of state to the world, is...

# MISSING

by Mary Brashier

from our menus



**H**ow many South Dakotans are buying lamb for the dinner table these days, asks Lowell Slyter, sheep researcher at SDSU.

The answer: Hardly any. The reason: The meat's not there to buy.

"We need a product," Slyter says.

"In most places, you can find lamb in the meat cases not more than 2 or 3 months of the year. Your chances are better if you live on the west or east coasts. In South Dakota lamb may show up in the stores for 2 or 3 weeks in the spring."

Slyter wants to capture a larger, longer share of the market by presenting a year-round supply of meat to stores and restaurants. In short, he advocates a value-driven marketing system, where lambs are marketed based on the value of the carcass, not on live weight.

"As long as we sell live weight, we're selling fat. Fat is more expensive to put on than lean, so why put it on to trim it off?"

The fat goes on when producers attempt to spread out the supply by keeping lambs in the feedlot too long. "We get them too

heavy. When lamb does show up in the meat case, consumers take one look, see more white than red, and pick some other, healthier-looking meat package."

Fall lambing remedies both the fat and the supply problems, Slyter says. A lamb born in the early fall is at its prime in terms of cutability and ready for market in January and February, traditional lambing months.

And that's just the start. He thinks that by selecting ewes for fall lambing, he'll eventually be getting ewes that will breed in other months, starting the move

Fall lambing solves several problems. It's a more relaxed, comfortable time of year—at least for the flock manager; it attracts more consumers by bringing prime, lean cuts to the market; and it helps value-added enterprises such as sheep feedlots and packing plants come closer to capacity year-round.



toward year-round lamb production and assuring a fresh, consistent supply of meat for the consumer. “If you build it, they will come,” he recalls a popular saying. “Once consumers get used to those nutritious, tasty lamb cuts, they will come back for more.”

Slyter’s flocks lamb in September and October at the SDSU Brookings sheep unit and at the Antelope Range field station in Harding County. He also has spring-lambing flocks to use for comparison.

He chose those months simply because they more conveniently fit his schedule. “That doesn’t mean there isn’t a place for the producer who wants to lamb in December.”

Bill Aeschlimann of Dakota Lamb, commercial lamb feedlot near Hurley, seconds that emphatically.

“We get most of our lambs out of the Newell-Faith-Belle Fourche area, and they’re the best in the country, and most of the operations out there lamb in the spring. But I can’t have my lots empty three quarters of the year. I need lambs year round.”

Aeschlimann slaughters 500 lambs a week and hopes to double his output. Even now he is bringing in lambs from southwestern and western states to keep his feedlots full.

“Why put all that freight on them when there are better lambs in South Dakota?”

To supply the local packer, keep competent workers, and increase the meat supply in the supermarket, Aeschlimann encourages East River farmers to lamb out in December or January, “a slack time of the year” for other farm work. “They’d still hit market ahead of the western lambs.”

“If a farm family had 300 to 400 ewes, that could amount to another \$10,000 to \$15,000 income that might keep them away from jobs in town. And there’s a packing plant right at their back door that’s USDA inspected.”

More than USDA inspected, actually.

Bridgewater Quality Meats is the largest kosher lamb plant in the U.S., says Slyter. The plant exports about a fourth of its boxed meats to Israel. The rabbis insist on a spic-and-span lamb; animal health is their number-one concern. But since they don’t use



**Slyter examines his fall replacement ewe lambs. Because he is breeding for genetics and not for meat, he only works with young stock, turning over generations as rapidly as possible and moving rams out after one season and replacing ewes at age 3, just as they're getting a good start on lifetime productivity.**

the hind saddle, the highest priced part of the carcass in other markets, Dakota Lamb takes this part of the carcass back to package as loin chops and boneless legs and markets them as certified American lamb, meaning they are USDA yield grade 1 or 2, highest ratings possible.

“To supply the packing plant and keep up to standards, I need a lean lamb, and I can’t keep it in the feedlot very long,” Aeschlimann says. “That’s why people like me can use what Lowell’s doing. When sheep producers raise lambs year round, I’ll be able to expand my operation, and they’ll be able to raise their incomes. “I guess that’s what they mean when they say value-added agriculture.”

**F**lock management doesn’t change all that much for fall lambing ewes, Slyter says.

“The ewes still have to be in the right body condition, 2.5 or 3. You weigh them, flush them, and use teaser rams. The biggest problem is that April 15 slips up on you if that’s the day you need

to put the rams out. And there you are with ewes that haven’t had their vaccinations.

“Our mind set’s not a lot different than the ewe’s. Both of us are thinking of fall breeding. We’re all creatures of habit.”

Given nature, the ewe would lamb in the spring. Genetic selection is the only tool for permanent improvement for out-of-season lambing that Slyter has found.

“We tried all the shortcuts.”

Light, or the lack of it, works fine, but it is expensive to make a barn light-tight, Slyter says. Since sheep naturally breed in the fall, their hormones make the connection between short days and the beginning of the breeding cycle. Adding artificial light in the fall and winter

and cutting it back in the spring still helps Slyter pick his replacement ewe lambs. Once the ewe gets on a spring breeding schedule, she usually stays there.

Eventually, genetic selection for fall lambing traits will take over. Blood analyses for genetic markers may speed up the selection process.

“We’re trying to turn over generations just as rapidly as we can. Just like the ewes, our rams were born in the fall—we are breeding for genetics, not heterosis and meat as the commercial producer would do. One season and the rams are gone.

“Also, our ewes are ‘old’ and out of the system at age 3. That’s one reason our data doesn’t look as good as it might; normally, as the ewe gets older, her productivity goes up.”

**T**he early fall lambing lowers death losses because the lambs have an early start on cold weather. Lamb vigor is better, and when they are weaned about December 1, the ewe goes on maintenance feed through the winter months, reducing her feed costs. After breeding in mid April, she goes on grass until early fall again.

**“When sheep producers raise lambs year round, I’ll be able to expand my operations, and they’ll be able to raise their incomes. I guess that’s what they mean when they say value-added agriculture.”**

—Bill Aeschlimann, Dakota Lamb, Hurley

Meanwhile, the lambing barn doesn't have to be heated, and "we don't have to be out in minus 20 weather to be helping the ewe and saving lambs."

Although the lambing rate is lower, "the ewes just about make up for that by raising more of the ones they have."

"The whole thing is working out so well we're going to market in January, a little earlier than the peak prices but still good and most times better than the market for spring lambs."

Slyter could lamb later, "but that doesn't work for our operation because we want those ewes out of the barn so the next set of ewes can come in and lamb in late January and February. That gives us two lambing periods in the same barn, showing that you can double the efficiency of your facilities."

**W**hile 92% of the Brookings experimental ewes lambed last year, at par with the 93% for the spring lambing flock, Slyter is more impressed with the Antelope Range ewes. "We've gone from 13% of the ewes fall lambing up to 65% over about a 4-year period. That demonstrates that our selection process is working."

Slyter has built a crossbred population of quarter Finn, quarter Dorset, and half Targhee ewes. The Dorset has a long breeding season;

the Finn supplies high lambing rates, and the Targhee is hardy and a good mother. The ewes are bred back to rams of the same cross.

He is also working with purebred Hampshires and Columbias. Purebred producers are becoming interested in fall lambing because it gives them a much bigger ram lamb to sell for breeding purposes.

Purebred response to the change in schedule is good but could be better. The problem may lie with the rams since Slyter must use individual sires in the purebred flocks.

"A ram that doesn't do his job doesn't make the ewes look good, and we can't identify the poor

performers ahead of time from semen quality alone." In contrast, the crossbred flocks are serviced by multiple sire groups, so other rams can cover for a poor breeder.

**"I**f I could sell ewes and guarantee that they'd lamb in the fall, I couldn't keep up with demand," Slyter asserts. "For now, I have to tell producers they need to raise their own replacement ewes, because they can't buy what they need. But this will change in time."

"And then we'll be closer to a year-round supply of meat in the market. Good lamb chops and loins will catch on and sell themselves to the consumers." □



**Brent Larson, l, and Scott Kilber, r, paint brand lambs to match their moms before placing them in group pens. Fall lambing rate is lower but so is lamb death rate, so the figures even out, Slyter says.**

TEAM Spurge mounts a combined assault on this pernicious weed, because there is...

# NO SILVER

by Mary Brashier

Stemming the advance of leafy spurge across western rangelands has been a little like trying to put out a prairie fire with a garden hose, says Scott Kronberg, range scientist at SDSU.

But, he adds, the “little bit here, little bit there” approach is being supplanted by a four-state collaborative TEAM (The Ecological Areawide Management) Spurge project of the USDA Agricultural Research Service at sites in the Little Missouri River drainage. The federal project leaders called on Kronberg for his expertise in livestock grazing biocontrol.

Also tapped for TEAM Spurge membership were Leon Wrage, extension weeds specialist, Darrell Deneke, IPM strategies, and Sharon Clay, AES weed scientist.

Wrage is a believer in using just about anything that is safe and that works to keep pressure on what he calls “the toughest noxious weed in South Dakota.”

“The best leafy spurge control program combines mechanical, chemical, and biological measures. A multiple approach prevents the plant from recovering between control efforts. When it’s weakened, you have a better

chance of finishing it off. We aren’t going to stop leafy spurge with one tool,” he says.

The TEAM Spurge project is the first large-scale, systematic demonstration of integrated control for leafy spurge. At its research and demonstration sites in range settings, land managers can see different strategies in real-life settings before they select the control methods that fit their own preferences and budgets.

“It’s really looking like combining herbicides and sheep is better control than either one alone. A double whammy on the weed,” Kronberg says.

Flea beetles also appear to be effective biocontrol agents against leafy spurge at some locations. But again, Kronberg, Wrage, and other TEAM Spurge biologists believe that they are best used in conjunction with other methods.

Kronberg thinks that some landowners were drawn to last year’s TEAM Spurge field day near Buffalo mainly for the box of flea beetles they received at the end of the day. These insects are collected in North Dakota. Across the northern U.S. and Canada TEAM Spurge members collected

and redistributed more than 20 million flea beetles to 206 ranchers and land managers from 50 counties in 7 states last year.

“Combining alternatives is where the interesting things are going to happen and where the real advances in spurge control will come,” Kronberg says.

*Kronberg offered flea beetles again this year at the TEAM Spurge field day held in Harding County in late June. This year, the field day was a training session on insect biocontrol.*

*Unfortunately for late comers, the beetles were “sold out” well before the event. He urged interested parties to sign up now for Year 2001 delivery to ranchers and land managers.*

*That means checking with Harding County Extension Educator Ken Nelson (375-3412). Nelson is also the contact for the latest information on leafy spurge control in northwestern South Dakota.*



# BULLET

Leafy spurge is one of the most troublesome rangeland weeds that has ever invaded the U.S., Kronberg says. It is officially a noxious weed in South Dakota, and its economic impact in just the four-state area of South and North Dakota, Montana, and Wyoming is a staggering \$144 million a year.

Leafy spurge displaces native vegetation, reduces livestock grazing, degrades wildlife habitat, decreases rangeland plant diversity, and lowers land values. TEAM Spurge leaders estimate that more than 5 million acres in the U.S. and Canada are infested and that the number of infested acres has doubled about every 10 years.

In South Dakota, TEAM Spurge scientists are working only in the far northwestern corner. But patches of the weed occur in probably every county of the state, and heavy infestations can turn some pastures and croplands nearly pure yellow. Even homeowners battle the pernicious weed in their lawns.

Wrage's 1999 data show that leafy spurge infested 274,000 acres in South Dakota, 65 percent of that grassland. Total dollar loss when the weed is not controlled is \$10.3 million per year.

Once it gets a foothold, leafy spurge is nearly impossible to eradicate by any one method. Roots can grow far down into the soil and extend horizontally 15 feet per year. The aggressive root system defends the plant from drought, grazing, and herbicides, and shoots sprout from root buds, adding to the landowner's misery.

Ranchers and land managers have tried herbicides, grazing, and bio-control. None is a silver bullet.

Herbicide treatments alone can only be economically justified for small infestations. In rangeland, the cost of herbicide spraying can rapidly exceed the worth of the land and its potential production.

Tests in the Harding County TEAM Spurge project combine grazing and herbicides, using 2,4-D and reduced rates of picloram in the fall on regrowth after sheep have been on the plots.

"After the first year, the herbicides showed about 20% better control on the grazed spurge compared to the herbicide alone. This weakens the weed and also controls first-year seedlings. It's a real improvement over either method by itself," Wrage said.



Leafy spurge—the "toughest noxious weed in South Dakota," says Leon Wrage, SDSU extension weeds specialist.

Grazing alone can be effective, says Kronberg, "but only if cattle ranchers exchange their herds for flocks of sheep or goats."

Goats seem to prefer leafy spurge over grass, according to his earlier research. Sheep eat the weed and grass about equally, and cattle seldom—if ever—come back a second time if they have had a hearty graze the first time.

"After that first sizable meal, they learn to avoid it."

Kronberg has found from 1999 vegetation transects in his TEAM Spurge-sponsored research near Sentinel Butte, N.D., that Rambouillet, Suffolk, Columbia, and Polypay sheep grazing together removed about 55% of the leafy spurge and 50% of the grass.



Leafy spurge turns the hills around Sisseton pure yellow, thrives between the runways at the Sioux Falls airport, chokes out native plants and repels cattle grazing in the west, and flowers in otherwise well-kept lawns. Total dollar loss when it is not controlled is \$10.3 million per year in South Dakota alone.

Surprisingly, the degree of leafy spurge grazing depended on the breed of sheep.

“I feel comfortable in saying there are significant differences in breeds. Maybe they differ in the way their rumens degrade the toxic chemicals in leafy spurge.

“If so, perhaps we can eventually increase ruminal degradation of leafy spurge toxins in sheep and cattle and increase their consumption of the weed. And even if we can’t do that, we may still be able to help landowners improve their range and weed management simply by choosing the best breed of animal to use.”

The work in the field is done the old-fashioned way—with bags and a shovel or whatever it takes to get breed-specific feces.

“We collected a lot of fecal samples last year, brought them all back to Brookings, and dried and ground them to be analyzed by near infrared reflectance spectroscopy (NIRS).”

A control group of sheep was fed a diet containing known amounts of leafy spurge. Then Kronberg compared the NIRS spectra from these samples with that from the Sentinel Butte samples. “We could tell how much spurge the range sheep ate each week.”

And now, he says, if only he could figure out a way to get cattle to graze leafy spurge. “That’s the most intractable of all our challenges.”

**A** third leafy spurge option is biocontrol. From among a num-

ber of bioagents, flea beetles appear to hold the most promise. It would seem there’s a flea beetle for every location; of those studied, one likes shade, one likes lighter soil, and another prefers heavier ground. Hundreds of releases of the insects have been made across South Dakota.

But the insects are not always dependable.

“We just don’t know completely why they take hold in some places and don’t in others. Other scientists are beginning to sort this out. When the insects do successfully settle in, they’re real achievers,” Kronberg says.

Flea beetle adults do little damage to leafy spurge. But when the larvae hatch from eggs laid on the ground surface, they wriggle down

“...we’ve been really happy to cooperate with SDSU and TEAM Spurge. We’ve got to put the brakes on this weed. The multiple approach is the way to do it.”

—Larry Nelson, Harding County rancher

into the soil and into the leafy spurge roots. There they eat the roots from inside out before they crawl out and overwinter in the soil.

Even with each female capable of laying 250 eggs in her 3-month adulthood, it can take years for populations to build up to economic levels, according to TEAM Spurge scientists.

“The summer after a release, you might see an area 10 feet in diameter where they’ve killed most of the spurge, the next summer a little bit more, and the next, better yet. At one of my test sites, I even wondered this year if there’d be enough spurge to do grazing trials.”

Kronberg says weed scientists have learned that on really sandy soils, the spurge puts its roots down deep enough that the larvae can’t reach them. He also knows that sometimes beetles relocate a hundred or so yards away from original release sites.

“We just don’t understand everything about the beetle we should.”

Which brings him back to advocating combination efforts to control spurge.

“We know leafy spurge infests the entire state and it acts differently in different habitats,” Kronberg says. “But the TEAM Spurge project is focused on rangeland and wildlands and is limited to

the area where the four states come together.

Kronberg’s South Dakota experimental sites are in Harding County on Matt and Jim Johnson’s sheep ranch and the Larry Nelson ranch on the south fork of the Moreau River. Nelson raises both sheep and cattle.

And, like many of his neighbors, leafy spurge. But not a lot of it.

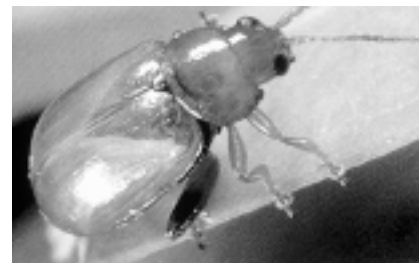
“We think we’ve got a bad infestation, but the people who know say it isn’t bad at all. But it’s starting to spread,” Nelson says. “Primarily, I’ve been trying to keep sheep on it and graze it off before it goes to seed.”

He had been “pestering” county educator Ken Nelson and county weed supervisor Tom Melum for news about bioagents; he’d heard about them through his participation on the Dakotas BLM resource advisory committee.

“It all came together. We got funding from the National Fish and Wildlife Foundation to set up a weed management area on the South Moreau drainage, and Dr. Kronberg and the TEAM Spurge folks came in about the same time.”

Kronberg divided his sites into sheep only, sheep plus herbicides, and sheep plus flea beetles.

“There’s a feeling among the insect people that too much vegeta-



**Brown-legged, top, and black dot flea beetles are in the mix of *Aphthona* handed out by TEAM Spurge as biocontrol agents. One prefers hot, dry sites; the other likes cooler, wetter sites. Adults are 3-3.5 mm long. Their larvae eat spurge roots from the inside out.**

tion will keep the soil from warming up enough to keep the flea beetles happy. Mature flea beetles don’t even start emerging from the soil until it’s fairly warm. Grazing where the beetles were originally released ought to get more sunshine down to the soil surface, warm it up earlier, and help the larvae get going earlier.”

The multi-state, multi-disciplinary TEAM Spurge project continues for 2 more years. Even now, practical, comprehensive IPM information regarding leafy spurge is reaching landowners like Nelson through field days, news media, and personal contacts.

“We’re glad to be involved,” Nelson says. “Our neighbors were starting to get nervous about spurge spreading downriver, and we knew we had to do something about it. The message I’d like to get across is that we’ve been really happy to cooperate with SDSU and TEAM Spurge.”

“We’ve got to put the brakes on this weed. The multiple approach is the way to do it.” □



Hoop barns work for hogs. Compared to a confinement barn, build one at about...

# A third the cost

by  
Jerry  
Leslie

**D**oes a quick start in the hog business without a lot of borrowed money sound good? Investigate the hoop barn research, now in its third year, at the Southeast South Dakota Experiment Farm, Beresford.

After the first 2 years of evaluation, SDSU scientists now can vouch that profitability of finishing hogs in hoop barns is quite close to that of controlled-environment total confinement—without the overhead.

That offers some special advantages to producers, the scientists say.

A farmer who wants to start raising hogs with a minimal capital outlay may find the hoop barn idea appealing.

A diversified farmer may see a hoop barn as a way to flex in-and-out of raising hogs as the market swings up and down, without being locked in to long-term amortization of an expensive, specialized finishing unit.

When not sheltering hogs, the hoop building can be used for hay, grain, or machinery storage or even provide shelter for another class of livestock, like calves.

This is how Brad Rops, SDSU research assistant stationed at Beresford, characterizes what he and co-investigators have seen so far.

Rops has been evaluating hoop barns with Bob Thaler, extension swine specialist; Steve Pohl, extension ag engineer; and Bob Berg, manager of the SESD Experiment Farm.

Profits from hoop barn pigs were very close, only 36 cents per animal less, to those of pigs raised in confinement in the first two trials completed in 1998 and 1999, Rops reported.

**H**oop barns can be erected for about a third of the cost of a total confinement barn, report the scientists, who kept track of every cost, including their own labor, when they put up the hoop barn in 1998.

Constructing this hoop barn would have cost a producer about \$15,000 in 1998, including the \$10,000 actual cost of site work and wall construction, plus the going list price at that time of about \$5,000 for the hoops and fabric.

Scientists projected the life of their hoop barn at 15 years, the length of warranty and length of time for which it is insured, and figured 20 years for the confinement unit. This is the basis of how they charged building costs to their pigs.

Even after the 15-year life-span, only the fabric roof material would likely need replacement, and that for a fraction of the total cost that went into the hoop barn.

Hoop barns are built on a framework of treated wood posts and side walls made of tongue-in-groove 2-inch treated lumber over a dirt floor. Feeders and waterers are located over a small concrete slab at one end of the barn. The cover is made of a heavy polyethylene fabric cover over galvanized steel tubing. Ends roll up and down, and half-moon top ends also can be opened or closed.

Pigs raised in the hoop barn were on feed longer and had a lower feed efficiency in the winter trials of 1998-99 but gained comparably to confinement hogs in the summer. Winter hogs in the unheated hoop barn, eating more to keep warm, put on a little more fat,

which reduced their premium for lean.

"We haven't seen many major drawbacks to the hoop barn," Rops said.

More specifically, pigs in the confinement barn gained 4 percent more per day than those in the hoop barn. Average daily feed consumption was 3.8 percent higher in the hoop barn. Confinement-raised pigs had 7.9 percent better feed conversion.

No difference in loin depth occurred between units; however, confinement-raised pigs had 0.10 percent less backfat and 0.8 percent higher dressing percentage, yielding 1.3 percent more lean meat.

In the two feeding studies, hoop barn pigs presented a cost savings of \$2.30 per head. However, confinement-raised pigs had receipts of \$2.67 more per head, giving 36 cents more net income associated with lean premiums than those raised in the hoop barn.

Extra cost per pig in confinement was incurred for manure application, death loss, overhead, and utilities.

The hoop barn had higher costs for feed, bedding, and labor but lower building costs and no heating bill.

This hoop barn is 30 by 84 feet. Stocking rates were 180 head, then 190, and 200 for the last group. "About 200 head seems to be the maximum capacity for this size building up to market weight," Rops remarked.

Two major management differences between hoop barns and to-

tal confinement are in manure disposal and environmental control.

In the hoop barns, Rops explained, pigs are bedded with straw throughout the feeding period as often as needed to keep them clean and comfortable, and manure is removed by payloader or skid-steer loader at the end of the feeding period.

Researchers are taking soil samples beneath the hoop barn to track nutrient movement through soil. They also have temperature data recorders at various places in the buildings to monitor pig comfort levels.

Twenty-seven big round bales of oat straw were used in the summer and 36 in the winter. The manure can be applied to fields for fertilizer value. This form of manure management cuts down on odor production and people are more comfortable with it.

The confinement unit, on the other hand, has partially slatted floors with hairpin gutters and a manure storage pit. Liquid manure slurry has to be knifed into the soil.

The hoop barn is unheated with ends that go up or down as needed to keep out wind and snow in the winter or provide some ventilation in the summer. Positioned in a north-south direction, the hoop barn can make use of north or south winds for summer ventilation. The manure-straw pack acts as a compost pile, providing some heat in the winter.

The confinement unit, on the other hand, is heated by propane in the cold weather and has ventilator fans for air movement year-around.

**T**he real difference is in financial outlay, since a hoop barn can be erected at about a third the cost of a confinement barn and most farmers can build it themselves, saving on labor dollars in construction.

Rops suggested the mild winter of 1998-99 may have reduced the utility costs required to heat the confinement unit, giving a slanted cost comparison. On the other hand, a severe winter also might reduce gains in the unheated hoop barn.

Since South Dakota weather is never consistent, Rops said he hopes the study will continue for a few more years so he can get good comparisons on growth and feed efficiency and carcass data over different conditions over the years.

Pigs going into the winter trial in the hoop barn had lower starting

weights than in the confinement unit. That helped extend their days on feed beyond that of pigs in confinement, he explained.

Rops also said that cost of application of the manure for fertilizer arguably could be assigned to cropping budgets rather than to the hog feeding enterprise.

**T**he hoop barn evaluation is one example of SDSU research that benefits family farms or smaller-sized farming operations. Many Southeast South Dakota farmers grow corn and raise pigs to add value to their corn.

Rops said the hoop barn has become a popular attraction during regular spring and summer field days at the farm. Those who stop are not only hog farmers or po-

tential hog farmers. Some examine the building with other kinds of farm storage in mind.

Funding for the hoop barn and associated research came from the South Dakota Corn Utilization Council, Sioux Steel Company, the Southeast South Dakota Experiment Farm Corporation, and the South Dakota Agricultural Experiment Station.

Detailed reports, the first on construction, the second on a comparison of the hoop barn and a confinement barn, appear in the 1998 and 1999 annual reports of the SESD Experiment Farm. Ask for the reports at the SESD Experiment Farm, (605) 563-2989 or e-mail the farm at [sefarm@abs.sdstate.edu](mailto:sefarm@abs.sdstate.edu), or from Bob Thaler, Department of Animal and Range Sciences, (605) 688-5011 or [robert\\_thaler@sdstate.edu](mailto:robert_thaler@sdstate.edu). □



**The hoop barn at the Southeast Experiment Farm at Beresford is an economical shelter for finishing hogs or other uses. Just roll in the big bales of straw, says Bob Berg, farm manager, and the pigs take care of spreading and rearranging the bedding to their liking. This hoop barn went up in 1998 for \$15,000.**

# Specialty hybrid with nearly twice the oil



High-oil corn grows okay but raises feeding questions in SDSU research

by Jerry Leslie

Brad Johnson, extension ruminant nutrition specialist, holds a handful of high-oil corn grown and fed at the Southeast Experiment Farm.

SDSU scientists testing a top-cross high-oil corn (HOC) hybrid are finding it grows like it is supposed to in southeast South Dakota and produces corn grain with almost twice the oil concentration of other hybrids.

HOC grown at the Southeast South Dakota Experiment Farm would have earned premiums of around 20 cents per bushel over normal corn in a marketing contract, based on how the contracts are typically written.

Instead it was fed to livestock in research trials at the farm. In cattle feedlots and swine confinement units, the HOC didn't always do what it was expected to, but it did produce some unexpected side benefits.

The research was meant to answer questions posed by corn

growers, farmer-feeders, and dairy producers. Major funding for the work came from the South Dakota Corn Utilization Council.

Oil concentration in the hybrid tested by SDSU in 1998 and 1999 was almost double that of the check hybrid. In 1998, HOC oil concentration was 7.2 percent vs. 3.8 percent in the control. In 1999, oil concentration was 6.7 to 6.8 percent vs. the check hybrid, which was 3.5 percent oil.

HOC from 1998 would have brought premiums around 22 cents a bushel and around 18 cents a bushel in 1999.

In one feeding trial, HOC replaced normal corn on a pound-for-pound basis. Pigs fed HOC

diets tended to gain faster and were more efficient than pigs fed normal corn diets, at least in the grower phase. But in the two subsequent finisher phases, no improvement in growth performance was found. Nor were there any differences in back fat. Pigs fed HOC had a minor, not statistically significant, tendency for slightly smaller loin eye areas.

Scientists found nothing inherent in HOC diets that should have reduced muscle growth. They suggested that the method of substitution of HOC for normal corn in the diet caused an imbalance in the lysine-to-calorie ratio, resulting in reduced loin eye area.

They designed a study to test that hypothesis, substituting HOC for normal corn while keeping the ly-

sine-calorie ratio identical to that of the normal corn diets. HOC diets balanced on a constant lysine-calorie ratio improved grower and overall pig performance and created a minor but significant tendency to larger loin eye areas.

This study also demonstrated that the reduced performance observed in the first trial was due to the method of HOC incorporation into the diet instead of HOC itself.

Both swine studies showed that a decision to use HOC in swine diets needs to be based on economics of the other feed ingredients, the benefit of reducing dust levels, and the balance of the lysine-calorie ratio. Principal investigator was Bob Thaler, extension swine specialist.

**I**n cattle-feeding trials, HOC did not improve performance or carcass characteristics such as marbling.

In fact, paying a 20-cent premium for the corn has been a losing rather than a profitable proposition for the SDSU ledger. Cost of gain was higher due to the premium value of the corn.

One surprise coming out of the cattle study was that cattle fed HOC had fewer liver abscesses, even though they did not gain better.

“That is hard to explain—cleaner cattle with less digestive upsets and metabolic disorders, yet performance is not different,” said Brad Johnson, ruminant nutrition scientist.

Johnson noticed in blood samples taken before slaughter that cattle fed HOC had a strong tendency to have lower levels of insulin-like growth factors. He thinks that perhaps HOC in the diet could have an interaction with the effects of implants. To test this, he designed a new study.

He wants to learn if non-implanted cattle fed HOC gain as well as implanted cattle on normal corn diet.

Another surprise came out of the cattle feedlots. Increased vitamin E concentration of high-oil corn carried over into the beef, helping it keep its color and providing longer case life.

Working independently, dairy scientists at the SDSU campus in Brookings tested HOC diets for lactating cows, since dairy producers often include extra fat in dairy rations to increase energy density of diets and boost milk production.

Preliminary results of an evaluation of the energy value of HOC for 12 Holstein cows did not show any advantages to feeding milking cows HOC in place of conventional corn.

**B**ob Berg, manager of the Southeast South Dakota Experiment Farm, summed up the agronomic side of the research, saying, “The farm had a successful year growing high oil corn.”

Berg measures success by whether he can produce enough HOC on about 100 acres to meet the needs of the livestock trials at the farm.

In 1998, weather was good, and HOC out-yielded its counterpart 155 to 130 bushels per acre, but the results were confounded by the fact that weather delayed planting of the control hybrid by 2 to 3 weeks, reducing its yield potential.

In 1999, the farm experienced weather extremes, from too wet in the spring to near drought by the end of the season, with hail in between.

That year, HOC yielded about the same as the control, around 100 to 105 bushels, in poor areas of the field and around 115 bushels per acre, about 10 bushels less than the control, in the good areas of the field.

The only special treatment required of HOC, according to Berg, was the need to boost the seeding rate, since the seed is a blend of pollinator seed and regular seed, and the pollinators may not be as productive.

In 1999, neither the HOC nor the check hybrid was profitable as a cash crop, because of low corn prices and poor growing conditions, Berg said. In 1998, as a cash crop, the control corn was within \$5 an acre of breaking even, and high oil corn made a profit of \$50 an acre.

**H**OC hybrids are not a result of biotechnology or gene transfer, rather the result of long-term conventional selection and breeding for the trait.

The hybrid being tested is a top-cross hybrid, meaning part of the

seed planted is for the pollinator, and the bulk of the seed is for the grain producer.

Several years ago, when the specialty crop came on the scene, the South Dakota Corn Utilization Council asked SDSU researchers to evaluate it. The Council has been financially supporting these research projects with grower check-off dollars for several years.

The researchers also acknowledge support from Optimum Quality

Grains of Des Moines, which did the laboratory tests on HOC and provided support for meat quality research. Support also came from DeKalb Genetics Corp. and Pioneer Hi-Bred International. The South Dakota Soybean Research and Promotion Council supported the broader crop rotational study of which HOC was a part.

Dairy scientists David Schingoethe, L.A. Whitlock, and A.R. Hippen headed the dairy research on HOC.

Extension Ag Engineer Steve Pohl works with Thaler in the swine projects, examining building, ventilation, and environmental issues. Brad Rops, research assistant, handles the on-site work in the livestock feeding trials at Beresford.

For more details, ask for the latest annual report from the SESD Experiment Farm, (605) 563-2989 or e-mail [sefarm@abs.sd-state.edu](mailto:sefarm@abs.sd-state.edu). □

**High-oil corn produces almost twice the oil of other hybrids, but feeding trials showed some surprises. Growers tended to gain faster and were more efficient than pigs on normal diets, but feeders showed no improvements in performance.**



SDSU extension upgrades farm and ranch business training and presents the...

# Master Business Manager program

by Jerry Leslie

**I**t's gotten a lot harder in the last decade to make a profit from farming or ranching.

This has prompted extension economics staff members at SDSU to re-think, re-shape, integrate, and improve the way they deliver their adult outreach business training seminars across the state.

A new and better program has been named the Master Business Manager program, MBM for short. Farmers, ranchers, and other agribusiness persons can come into the program at their experience levels.

"The MBM program strives to increase business and risk management skills, primarily among ag producers, but also among agribusiness people," said Burton Pflueger, extension farm management specialist.

The MBM program will help solve some of the short-term problems farmers and rural businesses are having while providing them with lasting skills for their long-term management over up-and-down economies, he added.

"This year has different kinds of stress than the crisis of 1984. For many producers today, it takes only something like one bad crop year to put them back into tight conditions."

Although pressures eased somewhat in the last year with an influx of government payments and improved prices for cattle and hogs, crop prices remain low. The need for business management skills is becoming more critical, and farmers and ranchers know it. Those who attended pilot MBM training sessions over the last year are asking for more. They will get more in the years ahead, Pflueger said.

**T**he training core is made up of five faculty economists, four extension area management specialists, and four county extension educators who have special skills or experience in some phase of business management. This nucleus has been meeting regularly and frequently since 1998 to brainstorm and evolve a new educational program.

Pflueger said clientele "wanted to know how one of our presentations would dovetail with the others. If we were doing a marketing workshop, they wanted to know more about how to bring crop insurance into the picture."

The team sees the MBM project as a way to gather up all marketing and management subjects they previously taught around the state, deliver them by developmental stages to a more advanced level, and integrate them to show how they all work together.

The experience is capped off with the writing of a total farm or ranch business plan and the awarding of a Master Business Manager Certificate.

"Hopefully this would represent a milestone in an individual's management career," said Dick Shane, head of the Economics Department at SDSU. Shane is a former longtime Extension grain marketing specialist with his own share of highway-time teaching marketing.

"We realized we were putting out a lot of good—very good—tools

Farmers and lenders in the MBM program gain each others' perspectives in sessions designed to increase business and risk management skills of the participants.



taught very effectively, but they still lacked the systems approach that brings all of those tools together into a plan for the business," said Shane.

"A lot of farmers, ranchers, and business people never have a plan, and this is one of the reasons they can get into trouble. We thought strategic planning was an integral part of programming needed by South Dakota managers," Shane said.

The economics staff will begin training county extension educators this fall.

"We're in transition, doing some training the way we used to, and tying all of it together. It will take a couple of years," Shane added.

The next objective, according to Shane, is to bring in crop and animal production specialists as part of the overall systems management approach to farm, ranch, and agribusiness management.

The desired outcome, Shane said, is improved profitability and sustainability.

Pflueger said the Extension economics group has conducted more than 100 training meetings across the state in the last year. He believed the team reached over 1,000 persons in the last fall-winter meeting season.

At the Watertown meeting conducted by Alan May, Pflueger, Matt Diersen, and Hamlin County Extension Educator Don Guthmiller, five ag lenders saw fit to take the new training along with their farm borrowers.

"It was very successful," said Guthmiller. "We talked through the risk management part of the marketing and they got a chance to learn each others' perspectives."

A follow-up survey produced "very positive comments by both groups of people," said Guthmiller. "They are eager to see the next phase," he added.

The MBM program, under an overall title of Balancing Risk and Profit, consists of five subject areas, each delivered in three developmental phases from beginner to experienced level. The five subjects are production risk and management; commodity marketing and price analysis; financial viability and sustainability; human resource management, working with others; and business planning and analysis, developing your business.

Some new tools in the program are getting positive responses from workshop participants.

One is a computer program called HedgeSim, a futures market simulator produced by the University of Illinois.

The program allows a producer to put together a marketing plan, carry it through using actual data from past history, and see returns on investments.

Another is a software program designed as a grain storage calcula-





The SDSU Extension Economics team which developed the Master Business Manager Program to teach farmers, ranchers, and rural businesses, studies a clientele needs assessment during Extension Spring Conference in Brookings. Clockwise, from left foreground: Burton Pflueger, Brookings; Don Guthmiller, Hayti; Ed Bowker, Hot Springs; Dan Oedekoven, Rapid City; Marty Beutler, Rapid City; Don Peterson, Brookings; Ed Gray, Salem; Alan May, Brookings and Sioux Falls; Matt Diersen, Brookings; Stacey Hadrick, Sturgis; Jack Davis, Madison; and Larry Madsen, Gettysburg.

tor. Written by Diersen, the program allows a producer to calculate whether it is more economical to sell, buy, or store grain based on the current futures market. It works year-round, but is most useful in the fall. The program calculates whether there is any “carry” in the market relative to storage costs. A third computer program is a fed-cattle pricing simulator.

**E**d Gray, county educator at Salem and MBM team member, piloted the “marketing for profit” segment of the program at Brookings and Flandreau. Of 80 participants, 50 completed a marketing plan for their farm—a feat that Department Head Shane considers “phenomenal.”

Recognizing that business management training doesn't relieve all economic and disaster-related stresses, the South Dakota Cooperative Extension Service is partnering with Avera McKennan Hospital in Sioux Falls in publicizing

and referring persons to a toll-free stress management hotline, 1-800-691-4336.

SDSU Extension also maintains a farm crisis response web page, <http://www.abs.sdstate.edu/ABS/CRISIS.htm>

Extension began partnering with Avera McKennan during the winter weather disaster of 1996-97 and has continued the relationship through the period of low livestock prices and continued low grain prices.

In addition, Midwest Market Analysis, a weekly program on South Dakota Public Television featuring SDSU extension economists focuses on weather issues and grain pricing and marketing strategies.

The MBM program, the stress management hotline, the farm crisis response web page, and MMA all are examples of how the Extension Service assesses emerging needs of South Dakotans and adapts its educational programming to meet those needs. □

*The business management professionals leading SDSU's extension economics training effort:*

**Extension specialists:** Richard Shane, head of Economics Department; Burton Pflueger, Donald Peterson, and Matt Diersen, all of Brookings; and Marty Beutler, Rapid City.

**Area extension marketing or management specialists:** Alan May, Brookings and Sioux Falls; Larry Madsen, Gettysburg; Dan Oedekoven, Rapid City; and Jack Davis, Madison.

**County extension educators:** Don Guthmiller, Hayti; Ed Gray, Salem; Ed Bowker, Hot Springs; and Stacey Hadrick, Sturgis.

*They will soon extend their reach by developing packaged training programs that county extension educators can use in field education units around the state.*

Virtual learning center ‘is not a place where you just sit back and take notes—you’re thinking for yourself and working with other people’

# Biostress Center of Excellence

by Jaimi Lammers

A new “center of excellence” is providing SDSU’s top agriculture and biological sciences students the opportunity to gain important communications and leadership skills. This center is not a physical building; it is a virtual learning center.

The South Dakota Board of Regents initiated the idea as a way to showcase selected students at regental institutions across the state. Each university was to create a center in its specialty.

As South Dakota’s land-grant institution, SDSU selected the Biostress Center of Excellence to provide qualified students with a unique educational experience in production agriculture.

“The Center will take students who are technologically sound and make them more global in their thinking,” said Fred Cholick, dean of SDSU’s College of Agriculture & Biological Sciences (ABS).

When students complete the capstone course, they will be technically and academically competent in their majors and they will have the enhanced skills in interpersonal relationships, team dynamics, diversity understanding, and group processes that will help them become community and industry leaders, added Doug Malo, distinguished plant science professor at SDSU, director of the

BiostressCenter of Excellence, and one of its instructors.

“The biggest goal of everyone concerned, from the Regents to the university, is to help students be better prepared for the world when they graduate,” said another course instructor, Bob Thaler, professor of animal and range sciences.

The Center gives students “the ability to tie in the bits and pieces they’ve learned from all their other classes—from reproductive physiology to farm and ranch management. They tie all those pieces together and solve a problem,” Thaler said.

Brad Milbrath, a former class member and May 1999 SDSU



Students in the first class offered by the Biostress Center of Excellence spent more time than they bargained for when applying their new communication and leadership skills in visiting, studying, and advising in a “real-life” ranch situation.

agronomy graduate, described what he'd learned in the course in job interviews. "It sparked the interest of persons I was interviewing with. They had never heard of a concept like that."

Kim Kruize, also a former class member, said the experience is helping her now as extension agronomy educator in Clark County. Kruize graduated in May 1999 with a double major in agronomy and animal science.

In the course, she said, "we talked a lot with the Natural Resources Conservation Service, the Farm Service Agency, and others that gave me an idea of what various programs and organizations do. This helps me when producers come in and ask me questions. I have some background knowledge about the program or can direct them to the agency that may be better qualified to help them."

**M**ilbrath said the interaction between students and teachers enriches the learning process. "Not many classes have a ratio of four teachers to nine students."

"Some students make a tremendous leap forward. Their communications skills and their level of confidence increases. That's been one of the most rewarding things about the class," said Thaler.

Sharon Clay, plant science professor, agreed. Of students she had worked with, "They went from shy and nervous to knowing their stuff. Even when they gave their final presentation and the dean was there, they did a great job."

Students come to the class from varied backgrounds—animal and

range sciences, agronomy, and agricultural business. They form teams. Along with the day-to-day classroom work, each team must give a report on the semester project to a review board at the end of the semester. The reviewers are the instructors, administrators from the ABS College, and others outside the program.

While there is an upside and a downside to teamwork, in business and personal life teams can be more effective in problem solving than individuals, said Malo.

"Team skills and leadership skills are some of the key issues employers have identified as critical to success, so they are integral parts of what the program and the experience is designed to do," Malo said.

Semester projects include rural development and community concerns identified by people across the state. Primarily, it is extension county educators and staff members who offer project suggestions. The subject of a project can be an individual farm or ranch, a small agri-industry, or even a rural community, but it must be related to production agriculture.

"One of the real positives of this course is the opportunity for students to integrate information



**Jim and Barb Beastrom, ranchers near Pierre, opened their doors and their ranch books to the class. Jim, an SDSU graduate, admitted he wasn't sure what he had gotten into, but counted the experience valuable.**

from different disciplines and apply it to a real agricultural enterprise," said Dick Pruitt, professor of animal and range sciences.

**I**n the program's pilot year, spring semester 1999, that agricultural enterprise was the Jim and Barb Beastrom ranch near Pierre. Students studied how the ranch's vitality and income could be improved, while respecting the cultural diversity of the area and environmental concerns, said Malo.

The Beastroms farm 3,500 acres northeast of Pierre and also run a 400-head cow-calf operation. Jim Beastrom said he didn't know what he was getting into when the students came visiting but found the experience to be very beneficial.

"When you've got nine people asking you questions, pretty quick you start to think about what you are doing and where you're going," he said.

Students visited the ranch several times during the semester. They also corresponded with the Beastroms by email, telephone, and fax.

And they spent more time than anticipated with the project. “That’s what happens with an open-ended project. We did not say, ‘You have to solve “x” or “y,”’ but rather, ‘You decide what the problems are.’” Malo said. “They were only limited by the creativity of the group.”

In the beginning, the students weren’t comfortable with this approach to learning, but the process was designed to help them learn how to ask the right questions, to discover concerns and problems, and then record the data and the resources. Creatively developing ideas to meet those concerns is the last step, said Malo.

The situation was more than just textbook, it was real life, said Clay. “Students generally tend to think first about expanding an operation to improve income. Beastrom’s two daughters are hired

help on the farm. One has now left for college, the other was a junior in high school at the time of the study.

“Is expansion what they should be doing?” Clay asked the students.

Each student consulting team developed a usable plan of action for the ranch. Every proposal had to be thought out carefully and inspected for its economic feasibility. For example, students had to ask, “If the team proposes a new crop or other new activity, is there a market in the area for that enterprise?”

Whether or not the Beastroms implement the recommendations, Malo said, “that’s the goal, but we’re not always expecting everybody will adopt everything that’s

“When you’ve got nine people asking you questions, pretty quick you start to think about what you are doing and where you’re going.”

—Jim Beastrom, rancher, Pierre

recommended. The idea here is the process of learning to work together as a team, to meet deadlines as a team, to iron out differences as a team.”

Some team recommendations coincided with what the Beastroms were already doing, such as switching half of their herd to fall calving. Another recommendation they have implemented is leasing four fields to an outfitter for commercial hunting. The Beastroms also plan to make their property more attractive to wildlife by planting cover strips of milo or sudangrass along the edges and center of the fields.

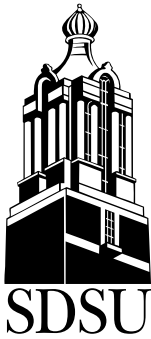
In spring 2000, students analyzed the Marc and Pam Scarborough farm/ranch near Hayes.

Originally offered only in the spring, the course will now be given every semester, and 14 students have signed up for this next fall. They can expect to spend 12 hours in class per week plus additional time out of class on the term project. Faculty members rotate in and out of the class, but four are always assigned every semester.

“Don’t expect to go in thinking that you can just go to class and then be done with the work for that week,” Milbrath advised future students. “This is not a class where you can just sit back and take notes—you’re thinking for yourself and working with other people.” □



The immediate temptation for the class was to suggest expansion to improve income. Alternative recommendations became more feasible, and some coincided with what the Beastroms are already implementing. The main benefit of the project, however, was that the students learned to work together as a team.



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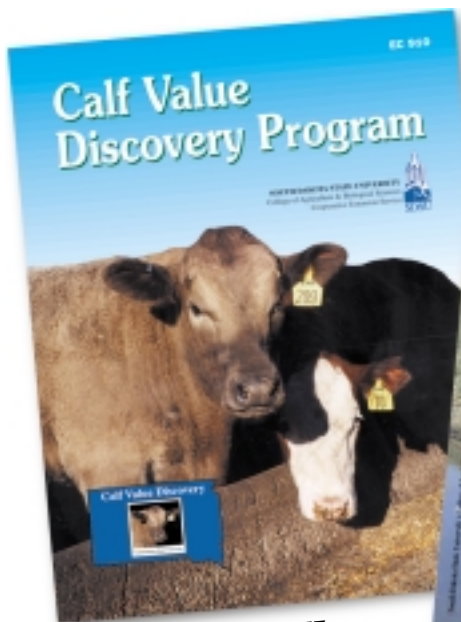
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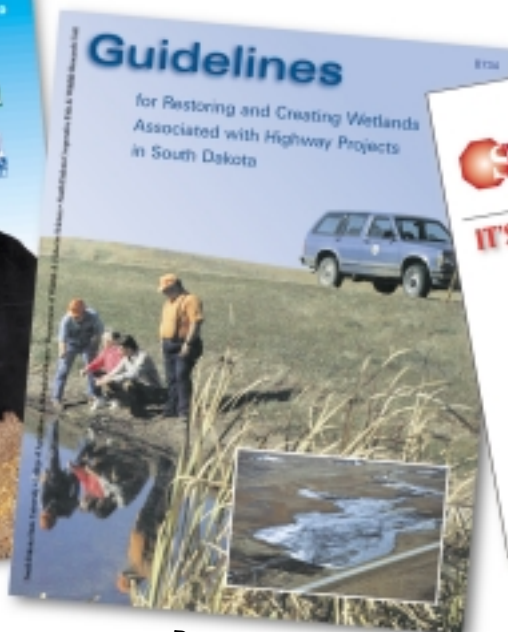
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