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CYANIDE POISONING
STRIKES CEDAR WAXWINGS

PUTTING FUN
BACK INTO THE GAME

ELEVATORS AT THE CROSSROAD

SOYBEAN APHIDS
WHEN DO GROWERS START TO LOSE MONEY?

ACROSS THE LINE, OUTSIDE THE BOX
FOUR-STATE RUMINANT CONSORTIUM

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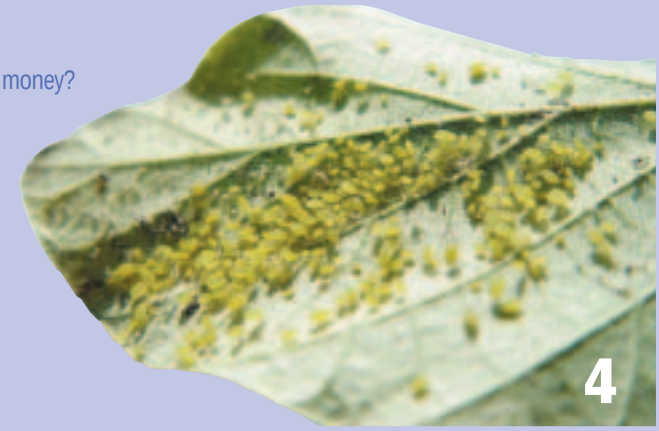

On the cover:

Bob Pollman has been executive director of the South Dakota Crop Improvement Association for 26 years, serving as the intermediary between farmers and university. During his tenure, the CIA has had a part in crop breeding, variety development, seed increase, seed inspection, quality assurance, and seed distribution. Read on page 14 about the new agreement between the CIA and SDSU to collect royalties on varieties of winter wheat, spring wheat, soybeans, and oats released by the South Dakota Agricultural Experiment Station.

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Director's comments

BY KEVIN KEPHART
Director, South Dakota Agricultural Experiment Station

more than the sum of individual parts

Kevin Kephart, AES director

I've been turning a word over in my head a lot lately: synergy.

"Synergy" and "synergism" are terms that come from the Greek words meaning "working together." But there's more to it than that. Webster's definition tells us that synergism is "the simultaneous action of separate agencies which, together, have greater total effect than the sum of their individual effects."

On a very practical level, what that means to us here at the South Dakota Agricultural Experiment Station is that our work doesn't end at the South Dakota state line. We accomplish more and give the taxpayers more for their tax dollars if we're working with researchers in other states to address our common problems.

Take a quick glance at the contents of this issue of Farm & Home Research and you'll see what I mean.

Our scientists are part of what's called the Four-State Ruminant Consortium because agricultural scientists realize that northwestern South Dakota has a lot in common with neighboring parts of North Dakota, Montana, and Wyoming.

We are required by federal mandate to work cooperatively across state lines in this way. South Dakota Agricultural Experiment Station scientists have been doing that for decades.

Whether we're talking about sheep producers, wheat producers, corn producers, their problems often have nothing to do with these political boundaries that we live in. The production problems, biological problems, and marketing problems they face don't end where a new state jurisdiction begins. The region as a whole benefits if area states work together because we have complementary areas of expertise that add that synergy to a research study.

Americans traditionally have expected this kind of cooperation from land-grant universities, no matter what state they're in. We see a case of it now in one of our research projects to try to determine economic thresholds at which producers should take action against the Chinese soybean aphid, a fairly recent arrival in the United States. Incidentally, the study is a joint effort of SDSU and the USDA Agricultural Research Service's Northern Grain Insects Research Laboratory in Brookings—more of that synergy we're talking about.

What's interesting is that although the project is looking specifically at the threshold for South Dakota's growing conditions, we know anecdotally that Minnesota producers are keenly interested in the results. Of course Minnesota farmers are used to different rainfall patterns and different soils. But learning about controlling this new pest is so crucial to them that they're reaching out across state lines to ask what the South Dakota Agricultural Experiment Station is learning about the aphid. In the same way, many of our producers will gladly tap into research from a neighboring state if it helps them deal with a crop or livestock issue. That's the way Congress wanted it to work when it set up an Agricultural Experiment Station in every state by approving the Hatch Act of 1887.

Very literally, Congress wanted us to think outside the box. That's part of what's driving our new agreement to begin collecting royalties. We recognize that our plant breeders fill a need for the entire region, not just South Dakota. Our own producers are paying royalties or technology fees on some of the varieties they grow that have been developed in other states. Now SDSU, too, will begin collecting royalties.

South Dakota isn't an island. There's always someone in other states who is interested in our research. That's true whether it's a study of grain elevators' ability to handle identity-preserved crops, a program by SDSU Cooperative Extension to make sports a positive experience for youth, or a study on why South Dakota's cedar waxwings have died at certain times of year from what seems to be naturally occurring cyanide poisoning. What our researchers learn often sheds light on problems elsewhere.

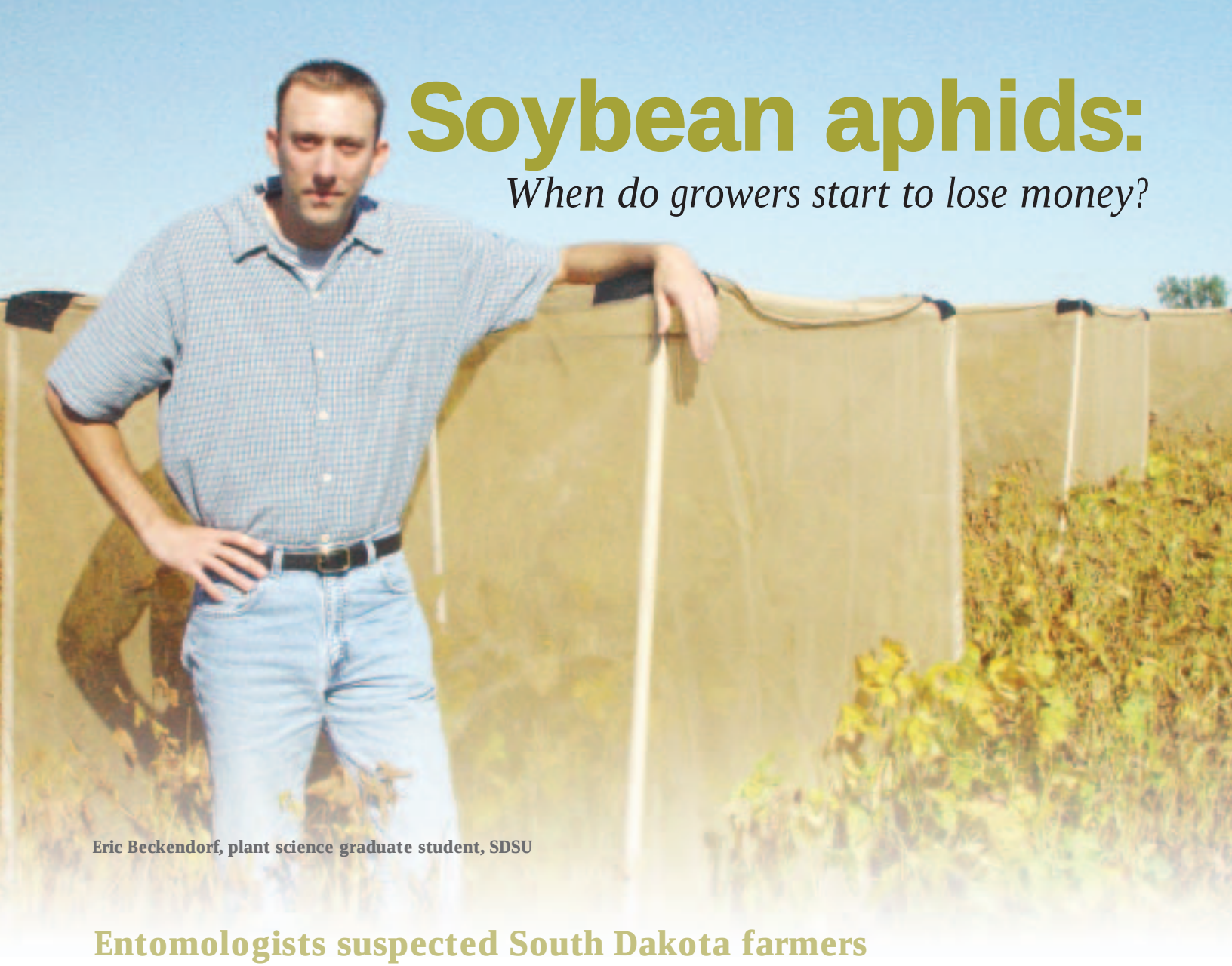
Opportunity doesn't end at state lines either. That's why we in South Dakota are seeing an influx of Hispanic workers, as the SDSU Rural Life & Data Center shows by extracting information specific to South Dakota from federal Census data.

It's clear that new people are finding jobs that need doing in South Dakota. Since agriculture is the largest industry in the state, it should come as no surprise that many of those jobs are in our agricultural sector. That's why our SDSU Cooperative Extension Service already has translated some of its dairy publications into Spanish.

This adds social diversity to our state, and that pays off in practical ways. If the history of America as a whole is any indication, new arrivals often bring new ways of thinking that may make it easier to tackle the same old problems. Here in South Dakota, I suspect the result may be a little bit more of what the Greeks called synergy.◆

Soybean aphids:

When do growers start to lose money?



Eric Beckendorf, plant science graduate student, SDSU

Entomologists suspected South Dakota farmers

had a new insect pest in their fields as early as 1996 because friendly forces had arrived—insect allies called Asian lady beetles.

They wouldn't have come in such numbers unless some other "bug" had also arrived. Asian lady beetles eat aphids, scale insects, and other soft-bodied arthropods that infest plants.

The presence of Asian lady beetles suggested soybean growers had a problem.

Asian lady beetles are the main predators of the soybean aphid, first found in the U.S. in July 2000 in Wisconsin. So when entomologist Robert Kieckhefer of the USDA Agricultural Research Service's Northern Grain Insects Research Laboratory (NGIRL) recorded the first Asian lady beetle in South Dakota in October 1996, it was a wake-up call that something new was happening in South Dakota fields.

On Aug. 28, 2001, when South Dakota State University Extension Entomologist Mike Catangui found his first soybean aphid in one of 10 South Dakota soybean fields he had scouted that day specifically for the pest, the suspense was over.

Now the real work began: determining the economic threshold at which South Dakota farmers begin to lose money if they don't control the aphid.

CATANGUI SAYS SOYBEAN APHIDS cause direct damage to plants by sucking the juice from plant leaves and stems, causing the leaves to curl and yellow and stunting plant growth. In its native Asia, the aphid can transmit viruses harmful to soybeans, including soybean mosaic virus. Researchers don't yet know how much virus transmission will take place in the U.S.

SDSU Graduate Student Eric Beckendorf is at work on the thresholds.

Fellow project members are Catangui; Marie Langham, SDSU plant virologist; and Walter Riedell, research plant physiologist for USDA's Agricultural Research Service (ARS) and Wade French, an entomologist, both at the NGIRL.

The first soybean aphid studies in South Dakota had to be done indoors because the pest had not yet been found in significant numbers in area fields.

In the greenhouse, Riedell, Catangui, Beckendorf, and ARS Research Technician Dave Schneider set out to determine how soybean yield and yield components reacted to infestations of soybean aphids. Plants were infested with aphids at the first node stage (V1), the third node stage (V3), the beginning

bloom stage (R1), the full pod stage (R4), and the beginning maturity stage (R7). Aphids remained on the plants for a total of 6,000 aphid days (6,000 aphid days is defined as 600 aphids present for 10 days) after which the insect pests were removed with insecticide.

Infestation at the earlier stages of plant development reduced the number of seeds per plant while infestation at later stages of plant development reduced seed number as well as individual seed weight. Yield reductions of about 5 to 6% were seen in plants infested in the V1 and V3 stages while plants in the R4 and R7 stages had between 7 and 12% yield loss, respectively.

"Aphids affect soybean quality, especially the oil level," Riedell says. He notes that the greenhouse experiment suggested the pests can be especially damaging at the R4 soybean stage, as pods are filling, and the R7 stage, when bottom leaves are starting to turn yellow and some pods are starting to turn brown.

The critical time for South Dakota farmers to take action is late July or early August, Catangui adds.

"Infestations of fewer than 10 soybean aphids per plant at critical times may be enough to warrant spraying."

NOW THAT THE SOYBEAN APHID is quickly spreading across South Dakota's soybean region, research has moved outdoors.

During summer 2003, Beckendorf used 64 cages, each a cube of 5 feet to a side, to infest plants with a known number of soybean aphids—10, 50, or 100 aphids per plants. The control cages had no aphids. Each cage contained two rows of 30 plants.

At 2-week intervals, Beckendorf took four plants from the cages. On two of the plants, he counted aphids. But he found he couldn't finish the counting on the spot—one plant, for example, that had been originally inoculated with 10 aphids, was loaded with 47,000. Freezing plant and aphids until later solved the counting problem.

Using the other two plants from each cage, Beckendorf measured the diameter of the stem at each node and the length of each node.

"What we're looking for is any stunting," Beckendorf says. "It can help answer the big question: At what stage of the soybean plant's development is the aphid population important?"

Beckendorf also will test protein and oil content of the seeds to see the effect of the aphids on soybean quality at different infestation levels.

In addition, he has taken infrared readings that measure the reflected heat from soybeans with a known infestation level, chlorophyll readings from the leaves, and leaf area index readings. All those data will lead to a better understanding of the soybean aphid and will help farmers manage the pest in the future, he says.

The South Dakota Soybean Research and Promotion Council has helped support the soybean aphid work from the outset.

"THERE'S A LOT OF RESEARCH to be done on this particular pest," says Alan Fenner of Menno, chairman of the Council's board of directors. "A lot of farmers have trouble deciding when to spray. We don't know yet how much the soybean plant can take from these insects."

"Infestations of fewer than 10 soybean aphids per plant at critical times may be enough to warrant spraying."

MIKE CATANGUI
SDSU EXTENSION ENTOMOLOGIST

Beckendorf, from a farm near Fairmont, Minn., knows the topic is important to farmers because he's received several calls from Minnesota farmers in his home area who have heard about his work.

There's not much he can tell them at this point.

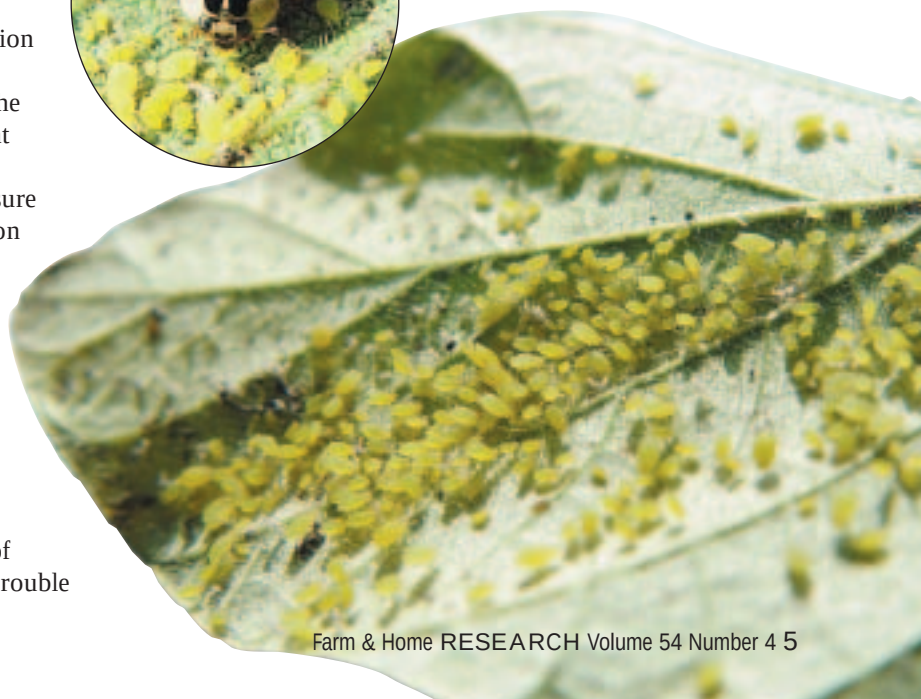
"I know the problem is here right now and the farmer wants to know what to do right now, but it's going to take some time to crunch these numbers," Beckendorf says.

Riedell adds that, in all likelihood, thresholds for soybean plants in South Dakota may be considerably different from a threshold in Wisconsin or Minnesota, where soybeans may respond differently to the pest because those areas typically have more moisture and deeper soils. South Dakota farmers will be the main beneficiaries of Beckendorf's study.

The Asian lady beetles?

Catangui admits to a fondness for the attractive little bugs. "They're a prime example of beneficial insects. They don't destroy wood and they don't bite you on purpose. If they come in your house in winter, it's only for shelter, they don't reproduce or feed indoors. In the spring they're back outdoors looking for soybean aphids." ◆

Asian lady beetle



Soybean aphids on a soybean leaf

"...state boundaries shouldn't box us in and others out. With the limited resources that we all have, we should all work together to provide producers sound, research-based information."

—Jeff Held
South Dakota Cooperative Extension Service sheep specialist

Jeff Held, Extension sheep specialist, SDSU

Across the line, outside the box

From Jeff Held's point of view, the impact of South Dakota State University research doesn't end at the South Dakota state line.

What the Extension sheep specialist learns from his South Dakota animals can be crucial help to producers in Wyoming or Montana or North Dakota, just as research in those states can help South Dakota producers.

That's why Held is pleased with the new Four-State Ruminant Consortium that coordinates livestock and grazing research on the Northern Plains. The consortium research focuses on northwest South Dakota and neighboring areas of North Dakota, Montana, and Wyoming.

"In this particular area, state boundaries shouldn't box us in and others out," says Held. "With the limited resources that we all have, we should all work together to provide producers sound, research-based information."

THE CONSORTIUM MAKES perfect sense for the people of the region, says Tim Faller, superintendent of North Dakota's Hettinger Extension and Research Center.

"People go where they can find the information they're looking for," Faller says, adding that now they have another source of information, and it's science-based information from land-grant universities.

In northwestern South Dakota and nearby corners of North Dakota, Montana, and Wyoming, each of the respective land grant universities for those states is roughly 400 miles away, Faller adds.

"The general agricultural economy around those universities is vastly different than what's here at the corners of these four states," Faller says.

Leif Anderson, an animal scientist with North Dakota State University, says that Cooperative Extension Service educators in border counties already are good at sharing resources across county lines, occasionally bringing in Extension specialists from a neighboring state for workshops and public programs.

The Four-State Ruminant Consortium will help coordinate research work across state lines, Faller says.

Kevin Kephart, director of the South Dakota Agricultural Experiment Station, says people at SDSU and the other institutions have been aware of the need for greater interstate cooperation.

"The top ag administrators from the four land-grant universities met to identify ways that we could work together on regional issues, and we agreed our scientists and Extension specialists would work across state lines and make their research findings available to the public.

"Given this approach, Sen. Tim Johnson of South Dakota was instrumental in obtaining a special grant through the USDA Cooperative State Research, Education and Extension Service to fund this work."

Kephart is coordinator for the Four-State Ruminant Consortium.

THE CONSORTIUM IS OFF to a fast start.

The first round of projects looks at sheep, cattle, bison, forage, and marketing issues in the four states.

More than $600,000 has been awarded so far—$331,195 from fiscal year 2002 funds and $316,588 from fiscal year 2003—for research projects involving SDSU, North Dakota State University, Montana State University, and the University of Wyoming. It's anticipated that a new round of projects in budget year 2004 will put an additional $316,000 to work on ruminant issues in the region.

"The research projects were selected on a competitive basis from proposals submitted from land-grant scientists and Extension specialists," Kephart says.

Held is the lead scientist in a study that looks at weaning, backgrounding, and finishing management strategies for range sheep producers.◆

Read more about SDSU ruminant consortium projects in an upcoming issue of Farm & Home Research.

Current projects:

- In South Dakota, North Dakota and Montana: weaning, backgrounding, and finishing management strategies for range sheep producers. The lead institution is SDSU.
- In South Dakota, Montana, Wyoming, and North Dakota: integration of crop and livestock systems with annual forages. The lead institution is North Dakota State University.
- In South Dakota, Montana, North Dakota, and Wyoming: Extension and outreach programs for backgrounding beef calves in the four-state region. North Dakota State University is the lead institution.
- In South Dakota, North Dakota, and Wyoming: the effects of weaning date and retained ownership on adding value to cow/calf production systems. SDSU is the lead institution.
- In South Dakota and North Dakota: work with six tribal colleges on issues in bison production. SDSU is the lead institution.

Elevators
at the crossroads

If the U.S. grain marketing system evolves into two separate channels, one of co-mingled grains and the second of non-biotech, conventional grains, South Dakota elevators should be able to make the transition smoothly.

The need for separate storage bins and dedicated grain hauling all depends on consumer demand and interest in food labeling, says Bashir Qasmi, South Dakota State University economist. "Right now, that is too fluid to predict."

At least one of every 10 grain elevators in South Dakota already has the facilities in place to segregate grains, conclude Bashir and Clayton Wilhelm, graduate research assistant.

The issue of segregating grains has come up because of the advent of transgenic grains—created by using the tools of biotechnology to combine genetic material from diverse sources, usually different organisms, to add desired traits to a plant variety. Conventional grains still have their markets. In addition, other high-value traits of some grains are creating demand for special "identity-preserved" handling so that those crops can be sold at a higher price.

"We feel that the South Dakota grain handling system is well equipped to segregate corn and soybeans at about 10 to 15% of the elevators in the state," the two wrote. "If the market demand for non-biotech grain expands, some elevators may switch over to exclusively handle non-biotech crops. This may be an alternative for medium-size elevators facing a strong competition from new, larger elevators."

Their findings are in line with the National Grain and Feed Association's estimate that roughly 5% of the nation's elevators can segregate grains without new investments if the tolerance level for transgenic grains is set at 1%. The cost of segregating conventional from transgenic grains increases as the tolerance level is set lower because of the additional difficulty in meeting the tougher standard.

STORAGE FACILITIES at 17% of the elevators statewide can be divided into five separate units, Qasmi and Wilhelm found. The highest percentage of elevators with such capability were in the West River and North-Central regions, where 27% to 32% of elevators can be divided into five separate units.

For the remaining four regions, 8 to 14% of elevators can divide storage space into five separate units.

"Roughly half of elevator managers are willing to consider handling identity-preserved grains for an average premium of $0.28, $0.37, and $0.38 per bushel of corn, soybeans, and wheat, respectively," say Qasmi and Wilhelm. "In our opinion, South Dakota's grain-handling industry is reasonably ready to participate in segregation as well as identity-preserved grains if the demand for non-biotech expands."

"In our opinion, South Dakota's grain-handling industry is reasonably ready to participate in segregation as well as identity-preserved grains if the demand for non-biotech expands."

—Bashir Qasmi and Clayton Wilhelm
SDSU Economics Department

Qasmi and Wilhelm note that South Dakota is currently the leader in adoption of transgenic corn and soybeans, first introduced in 1996. That makes the issue of handling and marketing transgenic grains vitally important to producers. In 2002, the year of their survey, South Dakota farmers planted 89% of their soybean acres to transgenic varieties, compared to 75% of acres nationwide. South Dakota producers also planted 66% of the state's corn acres to transgenic varieties, compared to 33% of corn acres nationwide.

The demand for non-transgenic corn and soybeans is currently very limited, the two noted, accounting for about 1 to 2% of 1999 U.S. corn, and 2 to 3% of 1999 U.S. soybeans. The demand for non-transgenic corn and soybeans comes mainly from Japan, the European Union, and a small number of American food manufacturers who use only non-biotech ingredients.

Qasmi and Wilhelm say that the move toward segregation and identity-preserved grains is only the latest change in an industry that already has seen major shifts in recent decades. South Dakota's grain-production and grain-handling industries have redefined themselves over the past three decades by moving away from oats and barley toward more corn, soybeans, and wheat.

Meanwhile, the number of commercial elevators has significantly decreased over the past 30 years, from 387 in 1974 to 203 in 2001. Average operating capacity of the remaining elevators is much larger, increasing from 131,000 bushels in 1974 to 612,000 bushels in 2001.◆

Bashir Qasmi, economist, SDSU

Putting FUN back into the game

Youth play sports to have fun, spend time with friends, and learn new skills. But too often their parents and coaches want them to win, sometimes at all costs.

This stresses out the kids, says Ann Michelle Daniels, South Dakota State University Extension family life, parenting and child care specialist.

"Putting Youth Back Into Sports" from the South Dakota Cooperative Extension Service is a training curriculum that seeks to teach parents and coaches how to put the fun back in youth sports. Daniels wrote the program with Daniel Perkins, associate professor of family and youth resiliency and policy at Pennsylvania State University.

"This is a resource for parents, coaches, and communities involved in youth sports. It focuses on how sports can be a positive, character-building experience for youth," Daniels says.

The program has three modules, a community resource book for parents and coaches, a series of tabloids for youth, parents, coaches, and community organizations, fact sheets, and various other training materials. It has recently become available to land-grant institutions and other organizations nationwide.

SOME 43 MILLION CHILDREN in the U.S. play organized sports, Daniels says. But up to 70% of them quit before the age of 12.

"They quit because they stopped having fun and they felt too much pressure. That's too bad, because sports provide an excellent environment for positive character development.

"But doing that takes work. It requires a conscious effort from everyone involved in youth sports—including parents, coaches, volunteers, referees, and sports organizations."

Putting Youth Back Into Sports teaches the tools to support that effort—practical suggestions based on current research in child development and youth sports issues. It contains science-based information about a range of issues including youth development, moral development, achievement motivation, and conflict resolution.

The program addresses all aspects of youth sports, including youth-parent, coach-parent, and coach-youth relationships. It also discusses how community organizations, including the news media and local businesses, can influence youth sports, Daniels adds.

The training curriculum has been endorsed by Adam Vinatieri, NFL kicker for the New England Patriots. Vinatieri grew up in Rapid City and graduated from SDSU in 1994

"Sports allow children to learn about things like fair play, commitment, teamwork, perseverance, and sportsmanship. The Putting Youth Back Into Sports program is a valuable tool to encourage parents, coaches, and community organizations to foster those learning experiences in children."

—Adam Vinatieri,
New England Patriots kicker and 1994 SDSU graduate

Jason Parker, president of the Brookings Soccer Association, has four sons (ages 13, 11, 8, and 6) who all play soccer. Parker coaches three teams, while his wife, Shelley, coaches the fourth.

with a degree in health and physical education. He was a place-kicker on the SDSU football team and became the school's all-time scoring leader as a kicker.

In his endorsement, Vinatieri says that "sports allow children to learn about things like fair play, commitment, teamwork, perseverance, and sportsmanship. The Putting Youth Back Into Sports program is a valuable tool to encourage parents, coaches, and community organizations to foster those learning experiences in children."

SUCH A SERIOUS EFFORT to change behaviors took a lot of effort to gel.

Five years ago, Larry Tidemann, director of the South Dakota Cooperative Extension Service, was looking for ways to help volunteer coaches, who may not have had any formal training or background in youth development or sports psychology, to make sports a positive experience for children.

"We wouldn't totally eliminate competition and winning, but the youngsters shouldn't have to 'win at all costs.' They should have fun. That's what national survey after national survey shows. Kids play sports to have fun.

"The point is to emphasize how we as parents and coaches can have a positive influence on youth," says Tidemann.

Daniels developed the program and the Brookings Soccer Association was one of the first sports organizations in South Dakota to implement it.

"The program teaches coaches how to let the kids have fun and have an enjoyable experience while they're learning the skills."

—Jason Parker,
President, Brookings Soccer Association

BSA President Jason Parker became interested in the program because of what he'd seen among soccer parents and coaches.

"I've seen coaches and parents get into fights. Not so much physical fights here in South Dakota, it's mostly arguments, although there was one case where a parent struck a referee. Arguments over the rules are very common, and parents and coaches may argue with the referee. There are also a lot of coaches who get into arguments with each other."

BSA started Putting Youth Back Into Sports training with the Fall 2002 season, when all coaches of U6 teams attended a coaching clinic taught by Daniels. U6 teams are the youngest players—5-year-olds. In Fall 2003, the new group of U6 coaches and any new U8 (6- and 7-year-olds) team coaches went through the program. About 900 children play soccer in the BSA, ranging from U6 to high school. The organization has approximately 90 coaches, all of whom are parent volunteers.

The plan is that every year new coaches will be required to attend a coaching clinic and study the workbook. "The idea behind it is that if we get the U6 coaches when they start, most of them will move up with their kids, so eventually every age level will be covered," Parker explains.

Ann Michelle Daniels wrote the Youth into Sports resource.

"ALL THE COACHES who went through the training last year are still coaching, and they are still enjoying it, which is very uncommon," Parker says. "Most of the time they'll have a bad experience with a parent or another coach and they'll quit."

Better yet, the kids also stay involved and continue to enjoy the sport.

"The program teaches coaches how to let the kids have fun and have an enjoyable experience while they're learning the skills. That's how it has affected the soccer program."

John Fraser, Brookings, coaches U8 soccer and went through the training in Fall 2003. He says that it was interesting to find out how kids learn and feel and what they respond to in different age groups.

"We learned to keep it light and fun," Fraser says. "We have more games during practice than drills, and we keep the games short.

"The kids all try different things, and we use reinforcement and a positive approach. We put less emphasis on the game and more on individual experiences. The kids' responses have been very good. They're having fun."

Parker says the program has also helped him in his function as BSA president. "Many times I've been called out to referee between a parent and a coach. This program has taught me how to listen and how to diffuse the situation, make them think a bit without getting all upset and having arguments."

"We don't worry about who won the game. We just go out there to have fun."

—KYLE STEGEMAN, AGE 7, BROOKINGS

YOUNG BSA PLAYERS now may not even keep score.

"We suggest that the coaches don't let their teams run up a 15 to 0 score," Parker says. "If it's clear that your team is winning big, there are things you can do. You don't have to tell the kids not to score, but you can make it more challenging.

"For example, tell them it has to be a header, or they have to score outside of the 18-yard line. Also make sure that all kids have equal playing time, so that it's not just the best players who get to play."

Parker also suggests that parents "join in the fun." He recommends that instead of asking their kids "Did you win?" parents can ask them "Did you have fun? Did you learn anything?"

Daniels says that's "right on.

"The program is intended to encourage youth, parents, and coaches to focus on intrinsic motivations such as mastery of skills rather than extrinsic motivations such as comparison with others.

"Competition doesn't have to be negative. It can be a great motivator and often provides the thrill of the game. But it needs to be kept in perspective and it should be balanced with cooperation. If we teach kids that it is okay to cheat and be aggressive to win a game, then it is very likely that they will transfer those attitudes to behavior outside of the sports field."

And the young players have taken to the program.

Says one of them, a 7-year-old soccer player, Kyle Stegeman, "My soccer coaches always tell us just to have fun and not worry about the score. It helps a lot. We don't worry about who won the game. We just go out there to have fun."◆

The program works for any sport. For more information, look online at http://sdces.sdstate.edu/youthinsports/

Royalties

will be claimed on new varieties

A new policy to assess royalties on varieties of seed developed by South Dakota Agricultural Experiment Station plant breeders will provide additional funding for plant breeding programs and reward the breeders for good work.

Fred Cholick, dean of the College of Agriculture and Biological Sciences (ABS), has announced that South Dakota State University has signed an agreement with the South Dakota Crop Improvement Association (SDCIA).

According to the agreement, the SDCIA will collect royalties on new varieties developed by the South Dakota Agricultural Experiment Station (SDAES) for release in 2004 and after.

"This royalty collection policy does not apply to previously released varieties from 2003 and before," says Bob Pollmann, executive director of the SDCIA.

SDSU initially will charge royalties on new varieties of winter wheat, spring wheat, soybeans, and oats—the species that SDSU and producer groups have agreed upon. The royalty policy can be expanded to include additional species if SDSU, the SDCIA, and stakeholders agree.

Royalty rates will be 30 cents per bushel for winter wheat and spring wheat, 50 cents per unit for soybeans, and 20 cents per bushel for oats. Those rates can be adjusted if SDSU and the SDCIA agree and if stakeholders support the changes. But the rate charged on a variety will remain the same through the life of that specific variety.

A PORTION OF THE ROYALTIES collected will come back to the non-profit SDCIA, says Clark Moeckly of Britton, its president. The SDCIA will use its portion of the funds to support on-going projects at SDSU.

In a typical year, SDCIA funds from $50,000 to $125,000 to assist research projects at SDSU.

The SDSU portion of the royalties "helps the Experiment Station retain talented and experienced researchers while filling key vacancies with well-qualified candidates," Moeckly says. "In the long run we end up with better varieties."

Bob Pollmann is executive director of the South Dakota Crop Improvement Association. He holds a copy of the Granger contract.

Pollmann adds that royalties will be collected only on varieties protected under Title V of the U.S. Plant Variety Protection Act (PVPA). A variety must meet specific criteria to qualify under the federal PVPA. Title V of the act specifies that varieties can be sold for seed by variety name only as a class of certified seed.

"THIS POLICY BUILDS on a history of more than 75 years in which SDSU and the South Dakota Crop Improvement Association have worked together to provide varieties for growers in our state and region," Cholick says. "We have limited mechanisms to reward faculty for developing new varieties and to support their plant-breeding work. This agreement will provide additional resources to meet both of those needs."

SDSU Spring Wheat Breeder Karl Glover says many people will share in the benefits of the university's latest spring wheat, 'Granger,' the first release since the royalty policy went into effect. Besides the farmers who ultimately harvest a crop with agronomic characteristics specifically tailored to their needs, two wheat breeders and a plant pathologist will share a percentage. There is no stipulation on what the developers of a variety do with their share of the royalties.

Cholick adds that several other states in the region currently are charging royalties or research and development fees for access to the varieties developed at their land-grant universities.

"Yes," says Moeckly. Certified seed growers and commercial producers recognize that other states are putting royalty policies in place to support their plant-breeding programs, he adds. That helps growers understand the importance of SDSU's own royalty policy to help pay for its plant-breeding work.

"If the variety is good enough, producers are going to buy the seed regardless of whether there's a royalty charge," Moeckly says.

THE SPRING WHEAT VARIETY 'Ingot,' released by SDSU in 1998, provides an example of how much revenue the new policy could generate from a crop variety, says Pollmann.

"In the long run we end up with better varieties."

—Clark Moeckly
President, South Dakota Crop Improvement Association

Had the royalty policy been in place from 1999 to 2002, the estimated royalties generated by Ingot in that period would have totaled $432,806. About 18% of that, or $77,905, would have come from South Dakota certified seed producers, while an estimated 82%, or $354,901, would have come from certified seed producers in North Dakota and Minnesota who chose to grow the SDSU variety.

Pollmann arrived at that estimate by using actual acres of certified seed devoted to Ingot in the three states.

Several recent releases would have generated more revenue, he adds. He chose Ingot as an example because it is probably a better indicator of what a typical release would generate.

The SDCIA will receive 75% of the first $100,000 in royalties collected on each variety and 25% of additional royalties. That allows SDCIA to recover its collection costs and to continue its research grant programs.

SDSU will receive 25% of the first $100,000 in royalties collected on each variety and 75% beyond that. Of the funds going to SDSU, the employee or employees who developed the new crop variety will receive a minimum of 50% of the first $100,000 collected and 25% beyond that. The university will funnel 40% of its portion to the ABS College; the dean will distribute to the SDAES and the academic department where the variety originated. These entities will use the money to carry out further research, teaching, and Extension work.

Cholick says the formula for fund distribution is in keeping with existing policies of SDSU.◆

Jump-start on the future

Matthew Ward's research could affect one of his favorite hobbies: fishing.

Ward, a December 2003 graduate of the Wildlife and Fisheries Sciences Department at South Dakota State University, studied the effect of temperature, precipitation, and wind on yellow perch reproductive patterns.

Armed with a fine-mesh tow net and a grant from the South Dakota Experimental Program to Stimulate Competitive Research (EPSCoR), Ward counted young yellow perch in seven lakes across eastern South Dakota.

This species serves a dual role in South Dakota lakes, says David Willis, distinguished professor of wildlife and fisheries and Ward's advisor.

"Yellow perch are one of our most popular sport fishes for anglers. We especially seem to like fishing for them through the ice in winter.

"They are also an important prey fish. Predators eat young perch, and chief among perch predators are walleyes. It's not too much of stretch to say walleye need perch. And we like walleyes, too."

Yellow perch

EVERY TIME THAT Ward and an assistant visited a lake, they sampled from the same area at the same time of day. They trawled a specified area for 5 minutes, then recorded the number of fish caught per 100 cubic meters of water.

But they didn't just motor around a lake counting fish. They correlated their catches with precipitation, wind speed and directions, and temperature from the last week in April until the second week in June.

And they found this: Perch reproduce better during years when the spring has less wind, higher precipitation, and warmer air temperatures. "Whether wind, temperature, or precipitation was most influential seemed to vary by lake," Ward adds.

THOSE FINDINGS DIDN'T MATERIALIZE after just a summer's worth of work. Ward also used information that graduate and undergraduate students had collected while working on their own projects, sometimes as far back as 7 years ago.

"I'm really proud of him," says Willis. "He was able to do his own work and then integrate it with all the previous studies."

Years can go by before a reliable picture takes shape when working on environmental studies, Willis says. "We need a lot of different weather conditions and a pile of data if we are going to predict yellow perch abundance over the long term."

Some parts of the picture are still hazy.

"That's why we're fortunate to have South Dakota Game, Fish and Parks sending us an intern this coming summer to continue the work," he adds.

YELLOW PERCH MAY BENEFIT from high snow melt or spring precipitation that raises lake levels, inundates woody debris, and increases nutrient input to the aquatic food chain, Willis says.

"That may be why the greatest larval yellow perch abundance we found was in Waubay and Sinai lakes in 2001. They had a year of high April precipitation," says Ward.

"March through May weather patterns—in different combinations—affected larval yellow perch abundance in all seven study lakes."

—Matthew Ward, SDSU 2003 graduate

Matthew Ward, now a graduate student in the Wildlife and Fisheries Sciences Department.

"On the other hand," he adds, "we couldn't find evidence to support the popular idea that high spring winds have a bad impact on hatching success—that strong spring winds dislodge egg masses and wash them up onto shore.

"These winds would have to occur in late April," he says, "but our lakes with low hatch had strong winds in March, weeks before the first egg masses were laid.

"Perhaps the connection between March wind speed and hatching success indicates something other than direct loss of egg masses. Perhaps wind speed is a surrogate for a weather pattern, like a series of frequent cold fronts, that affects egg development or fish behavior."

Despite the 7 years of trawling and seining, Ward cautions that these are still incomplete results. "It takes a long time and a lot of effort to collect data from the environment," he says. "However, March through May weather patterns—in different combinations—affected larval yellow perch abundance in all seven study lakes."

WARD HOPES this research will help people in his profession.

"Hopefully, it will give fisheries managers a good idea of how yellow perch reproductive patterns are affected," he says.

"They can adjust their management according to these early indicators," Willis adds, explaining that stocking decisions could be made based on weather conditions.

The findings also matter to people who fish because yellow perch are "the most popular panfish among South Dakota anglers," Ward says. "The number of perch also affects the number and size of the walleye."

Ward has presented his findings at professional meetings and they will be published in the international publication Journal of Freshwater Ecology.

WARD WAS JUST ONE of 10 SDSU students to receive a 2003 EPSCoR grant.

"It's rare for an undergrad to get that quality of experience," says Willis. "It's very much like being in the graduate program."

Ward, the son of Randy and Claudia Ward of Graceville, Minn., began a graduate program in the Wildlife and Fisheries Sciences Department in January 2004 and will work with walleye and gizzard shad in western South Dakota reservoirs. His career goal is to be a fisheries manager in a state agency.◆

‘Infinite variety, infinite opportunity’

Luis Martinez Andrade

Miguel Gonzalez Sierra and Luis Martinez Andrade are both from Guadalupe, a small town in the Tamaulipas province of Mexico. Each of them owns a small farm with a few acres of land hardly able to sustain life for them and their families.

So every spring they head north, traveling 1,600 miles to Chester, South Dakota, where they harvest, ship, plant, and help maintain 200 acres of trees at Anderson Nurseries. After completing their 7-month contract, they drive back home to spend the winter with their wives and children.

HISPANIC MIGRANT WORKERS like Gonzalez and Martinez are taking over much of the manual labor workforce in U.S. agriculture and industry. Hispanics are the fastest growing minority group in the U.S., and the Hispanic population of South Dakota has doubled over the past 10 years, says David Olson, graduate research assistant at the South Dakota State University Rural Life & Census Data Center in the SDSU Rural Sociology Department.

Hispanics still make up just 1.4% of the total South Dakota population. But the number of people identifying themselves as Hispanic grew from 5,252 individuals in 1990 to 10,903 in 2000. Olson has extracted the information from the U.S.

Census of 1990 and 2000, and a report detailing the South Dakota data is available at the center's website at http://sdrurallife.sdstate.edu/

Population pyramids, graphic depictions of gender and age distribution of a population, illustrate that there are several differences between the Hispanic and the general South Dakota populations. The Hispanics skew younger, with a median age of 22.2, compared to a median age of 35.6 for South Dakota as a whole. There is also a larger proportion of males among the Hispanics.

Most notable is the increase in the proportion of males aged 20-54 in the Hispanic population from 1990-2000, showing that the population increase came mainly from immigration rather than from new births, Olson says.

The Hispanic population has increased in 60 of South Dakota's 66 counties. Largest concentrations of Hispanics are in the Sioux Falls and Rapid City areas, where industrial labor jobs are available. Many migrant or immigrant workers are also employed by agricultural enterprises across the state.

"... the Hispanic population of South Dakota has doubled over the past 10 years."

—David Olson,
SDSU Rural Life & Census Data Center

RUTH ANDERSON, owner of Anderson Nurseries, Inc., has employed four Hispanic workers, including Gonzalez and Martinez, at Anderson Nurseries, Inc., for several years. "They are filling a void for much needed labor," she says. "It became increasingly difficult to find American workers.

"We're a wholesale nursery and our business is seasonal. It's hard to find people who want to work from April 1 to November 1 and not work through the winter.

"We were also getting to the point where it was hard to find people interested in manual labor positions. The work here is all outside in the fields. Trees are dug with a spade, branches must be tied up first, and after digging the root, balls are pinned, tied, and crimped manually. We still prune and hoe by hand, although most of the cultivation is done with machinery."

Anderson hires the migrants through a federal program called H-2A, which grants temporary work permits to foreigners working in agriculture.

The program requires the American employer to first advertise job openings in the U.S. and demonstrate that it was not possible to fill the positions. The program also requires the employer to provide housing for the workers and to pay for transportation to and from their home country.

"The program is very expensive," Anderson says. "We have to pay a minimum wage of $8.24 per hour, guarantee 75% of wages for the length of the contract, plus provide housing and transportation. There are a lot of regulations regarding the type of housing you have to provide. We live in the country, so we needed to provide a house for the workers."

"We come here because we can make more money than in Mexico," Gonzalez says. "We like it here, especially now that we know how to do the work. We each have our specialty and know what each of us needs to do."

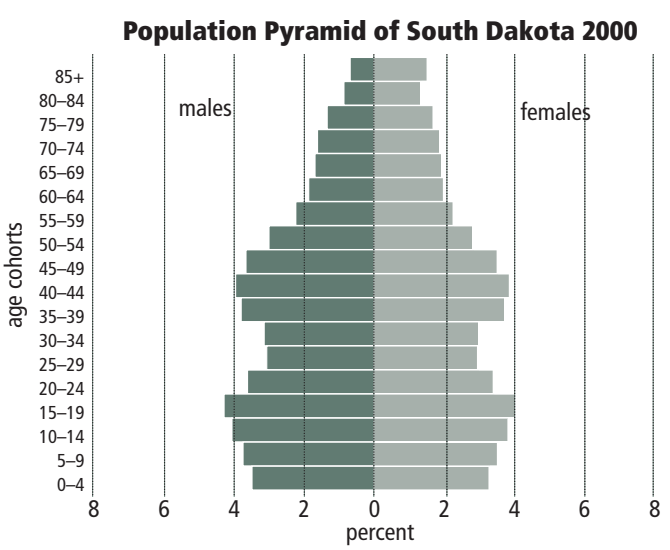
"It's quite a sacrifice for the men to come here," Anderson says. "They leave their culture, they leave their families, and they're doing it to be able to support and provide for them.

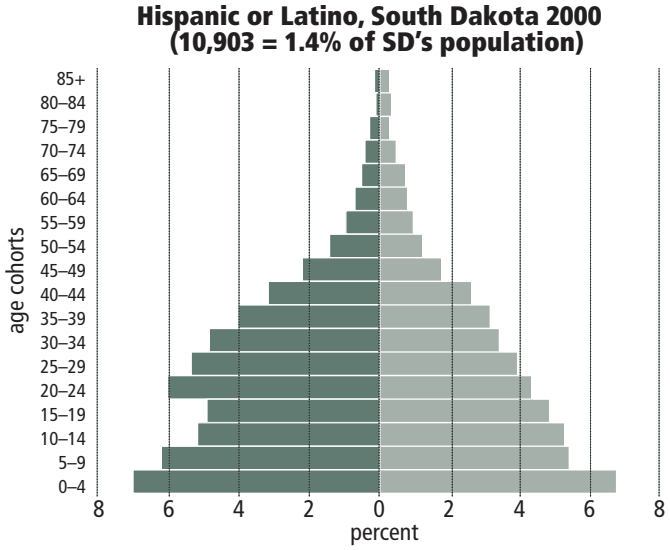
"It's hard on them emotionally. But it enables them to do things like put up a house, buy a vehicle, or buy one or two cows. I think they feel very fortunate, and they are also held in high esteem within their communities because they've made these sacrifices."

Anderson speaks enough Spanish to have a basic conversation, and the Mexicans also understand some English.

"After you work around the same people long enough you communicate. Sometimes it's not even by words, but you know what they mean. We also have an office employee who's fluent in Spanish, so she can help out if it's something intricate."

Anderson says that she is very happy with the arrangement. "We have a very close relationship with the men who work for us; they're almost like family. We do a lot of things with them, such as sharing meals, taking weekend bicycle trips, or driving to Sioux Falls for shopping or entertainment."





JUAN CARLOS, a recent immigrant from Mexico, works as a milker at a large dairy operation in eastern South Dakota. He says that he traveled to the U.S. to find work. "I'm 50 years old and it was hard to find a job in Mexico. I was laid off twice. That's why I came here." He has been in the U.S. for almost 3 years, married an American woman, and plans to stay.

Most of his Hispanic friends and colleagues are younger and single.

"Some of them come here to look for jobs, some to look for adventure. They may stay here for 6 months or a year, then go back to Mexico for a while," he says. "In the U.S. they can make ten times as much money as in Mexico. They live together, four or five guys in a house or apartment, so they can save money on rent."

The owner of the dairy operation says that about 15 of his 35 employees are Hispanics. Most of them are natives of Mexico, Guatemala, or El Salvador.

"They seem to like to milk cows, so they specialize in it and some of them get really good," he says. "Hispanics are milking more and more of the cows in the U.S. Many of them also work at chicken farms. Americans get burned out and find the work monotonous, but the Hispanic immigrants don't seem to mind. They work hard and make good money."

The owner admits that communication can be a challenge. He speaks a bit of Spanish, but would like to learn more if he could find the time. Most of the Hispanics who work for him do not speak English, with Juan Carlos as a notable exception. He learned English through self-study by reading, listening to tapes, and speaking with his American wife.

RECOGNIZING THE GROWING NUMBER of Hispanic workers in the dairy industry, the South Dakota Cooperative Extension Service recently put out its first Spanish-language publication, Extension Extra 4085, Contagious vs. Environmental Mastitis, published simultaneously in English and Spanish. Extension Dairy Specialist Alvaro Garcia, who wrote both versions of the publication, promises that more bilingual materials will follow.

"Today, there are many Hispanic dairy workers in South Dakota working as milkers. They are not taking jobs from Americans, because these are jobs that otherwise can't be filled—hard, manual labor jobs." Garcia says.

"Hispanic workers need the same kind of information available to English-speaking workers, especially if they work in an environment where the employer and co-workers speak very little Spanish," he adds.

"There is a clearly a need for materials in Spanish within the dairy industry. I regularly get calls from Spanish-speaking individuals requesting information. This is the first publication we have done in two languages. We will be doing many more."

Garcia, a native of Uruguay, is bilingual in English and Spanish. He holds a DVM from the University of Uruguay and Master's and Ph.D. degrees from the University of Minnesota. After receiving his doctorate in 1997, he returned to Uruguay and worked as a consultant for the dairy industry until hired by SDSU in 2001. His wife Cristina holds an M.D. degree from Uruguay and is an associate professor in the Nursing Department at SDSU.

The Garcia family frequently returns to Uruguay to visit, and the children speak Spanish fluently. "Spanish is the second largest language in the U.S., so it is definitely an advantage to be bilingual."

Garcia says that Uruguay and the U.S. are culturally very similar, with the culture, lifestyle, and food not very different. But he points out that it is a mistake to assume all Hispanics are similar.

"You have to remember that Hispanic immigrants come from many different countries and different cultural backgrounds. There are differences in the language from one country or region to another." He suggests that employers of Hispanic immigrants be sensitive to the cultural diversity within the Hispanic population.

"They are filling a void for much needed labor. It became increasingly difficult to find American workers."

—Ruth Anderson,
Chester, S.D.

Hispanic dairy workers at a large dairy operation in eastern South Dakota.

Alvaro Garcia, Extension dairy specialist, SDSU.

THE HISPANIC POPULATION in South Dakota will continue to grow, believes Olson of the Rural Life & Census Data Center. He says that the immigrants will benefit local economy by being able to take jobs in areas where American workers are not available.

"South Dakota's rural counties have been experiencing population declines for several decades," he says. "Farms have become larger and fewer. Farmers have become older, and many young South Dakotans have chosen non-agricultural careers.

"Even though farming is highly industrialized, there are tasks that require manual labor. If there are not enough people in those areas to fill them, hiring Hispanic workers becomes a realistic way to accomplish the work."

As the immigrant population grows, it will be increasingly valuable for South Dakotans who interact with the newcomers in schools, workplaces, and elsewhere to learn more about Hispanic culture and language, Olson adds.

"It is not essential that farmers and ranchers learn Spanish. But it will become increasingly helpful if there are residents in our communities who have multi-language skills to facilitate communication.

"Jobs in our communities will continue to attract Hispanics," Olson says. "The Hispanic community will become more visible and add to South Dakota's infinite variety."◆

Hispanic Immigrants

The data on Hispanic immigrants in South Dakota come from from the U.S. Census 1990 and 2000, conducted by the U.S. Census Bureau. The Census is a complete head count of all individuals in the nation, based on questionnaires sent to every household. A question on Hispanic origin was first included in 1980.

• A person of Hispanic origin can be of any race. The term refers to individuals who come from a Spanish-speaking country or from a culture that has a Spanish origin.

• The Hispanic population in the U.S. increased from 1990 to 2000 by 57.9%, from 22.4 million to 35.4 million people. In comparison, the total U.S. population increased by 13.2%, from 248.7 million in 1990 to 281.4 million in 2000.

• Most of the Hispanics in the U.S. live in the south or west, in states such as New Mexico, Arizona, California, Texas, and Florida. Most U.S Hispanics are of Mexican origin (58.5%). Other large groups include Cubans and Puerto Ricans.

• In South Dakota, 1.4% of the population is of Hispanic origin, while the national average is 12.5%. The Hispanic population in South Dakota has grown 107%, from 5,252 in 1990 to 10,903 people in 2000. The total population in South Dakota increased by 8.5%, from 696,004 in 1990 to 754,844 in 2000.

Cyanide poisoning strikes cedar waxwings

For the second summer in a row, South Dakotans found cedar waxwings dying in large numbers.

That prompted an investigation at the South Dakota State University Animal Disease Research and Diagnostic Lab (ADRDL).

The conclusion: Cyanide poisoning from plant sources likely caused the cedar waxwing die-off.

Tanya Graham

THAT WAS THE PROBABLE EXPLANATION that Tanya Graham, ADRDL veterinary pathologist, reported to the South Dakota Veterinary Medical Association.

Graham said the ADRDL examined more than 30 birds in a period of less than 3 weeks in 2003. People in Aberdeen, Brookings, Sioux Falls, Watertown, and surrounding communities in South Dakota had reported large numbers of cedar waxwings dying in late May and early June.

No lesions, infectious agents, or organophosphates or pesticides were found in the birds. None of the birds tested were positive for West Nile Virus, although the cedar waxwing is known to be susceptible to the mosquito-transmitted virus.

However, laboratory tests did show high con-centrations of hydrogen cyanide in plants available at the time and in the plant materials found inside the birds.

Graham said naturally occurring non-toxic compounds in plants called cyanogenic glycosides are converted to the toxic compound hydrogen cyanide (prussic acid) by plant enzymes released when the plants are crushed, wilted, frozen, chewed, or eaten during regrowth periods.

"Because this was the second year for increased numbers of dead cedar waxwings found between late May and early June, we suspected that the birds were consuming a toxic plant, flower, or berry that is readily available in early spring in eastern South Dakota," Graham said.

Cedar waxwings, courtesy of Dan Tallman, Northern State University.

NORMALLY, AN ANIMAL'S BODY produces enough rhodanese (a cellular enzyme) to convert hydrogen cyanide to the non-toxic compound thiocyanate, Graham said. But if the animal consumes a large amount of cyanogenic glycosides, the body's defense mechanism is overwhelmed and cyanide poisoning occurs.

Diagnosis of cyanide poisoning can be difficult because cyanide is lost rapidly from tissues. Within an hour of death, the cyanide concentration can be one-third the initial value.

However, Graham noted that two cedar waxwings found alive during the 2003 South Dakota die-off exhibited the kind of behavior associated with cyanide poisoning in birds—dyspnea (shortness of breath) and open-mouth breathing. They were also weak and unable to fly.

In addition, cotoneaster and crab apples, collected from sites where dead birds were found, contained 103 to 309 parts per million hydrogen cyanide (prussic acid). Plant material with greater than 200 parts per million is generally considered toxic to all animals.

The Olson Biochemistry Laboratory at SDSU found hydrogen cyanide (prussic acid) concentrations ranging from 15.4 to 87.6 parts per million. Levels of 1 part per million or more in the blood are generally considered evidence of cyanide poisoning.◆

"... we suspected that the birds were consuming a toxic plant, flower, or berry ..."

—Tanya Graham, DVM
ADRDL veterinary pathologist

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Garden Line on South Dakota Public Television

Garden Line regular panelists. Front Row: David Graper, Marty Draper (host), and Leon Wrage. Back Row: Rhoda Burrows, John Ball, and Mike Catangui.

Airs Tuesday Nights
April 27 - September 7, 2004
7:00 PM CT 6:00 PM MT

Garden Line is an hour-long weekly call-in program during the late spring and summer months. South Dakota State University Cooperative Extension Service specialists answer horticulture questions about lawn, garden, and house plants. Garden Line is in its 22th season during summer 2004.

Visit us on the web at http://garden_line.sdstate.edu/