MISSISSIPPI STATE UNIVERSITY
Animal and Dairy SCIENCES News & Current Events
Vol. 58 July 14, 2017

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2017 Award for Excellence in Multistate Research

By **Dr. Erdogan Memili**

Dr. Erdogan Memili is pleased to report that his research team on the multistate research project, **NE 1227 Ovarian Influences on Reproductive Success in Ruminants** received the award below from the Northeastern Regional Association of State Agricultural and Experiment Station Directors (nera).

Multistate projects are important for initiating and sustaining collaboratory research and for disseminating research results as well as for developing joint proposals. I would like to thank our department head, **Dr. John Blanton**, and our administrators including **Dr. Wes Burger** and **Dr. Gregory Bohach** for supporting the faculty's multistate research efforts.

Just one of the impacts of this study is the development of a patented pregnancy diagnostic test by which dairy producers know 10-20 days earlier than previous methods if a cow is not carrying an embryo, cutting producers' costs on feed and lost milk production from "open" cows without a pregnancy.

nera

Northeastern Regional Association of State Agricultural Experiment Station Directors

2017 Award for Excellence in Multistate Research

Presented to the Technical Committee of NE 1227
"Ovarian Influences on Reproductive Success in Ruminants"

June 14, 2017

Mark Rieger
NERA Chair

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Massachusetts	Rafael Fissore
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Pennsylvania	Joy Pate
	Francisco Diaz
	Troy Ott
Virginia Tech	Michelle Rhoads
Wisconsin	Milo Wiltbank
West Virginia	E. Keith Inskeep
	Jianbo Yao
	Jorge Flores

Animal Agriculture in China: Beef Industry

— A Study Abroad Course (ADS 4990) Report

by Elizabeth Mitchell and **Shengfa Liao**

On May 11, 2017, Dr. Binhai Cao, Professor of Beef Breeding at China Agricultural University and the Chief Scientist of the National Modern Beef Industry Technological System, delivered to our ADS students in ADS 4990 class an informative lecture entitled “Beef Production in China” in Chinese, which was translated by Dr. Shengfa Liao on site.

From the lecture, they learned that the Chinese beef industry is relatively young with respect to the meat production industries in the world. Historically, bovine cattle were not raised for meat production in China but for draft use. Since the cattle were highly respected for agriculture and human lives, slaughter of cattle for meat consumption was strictly prohibited. The occasion of eating beef arose only when cattle could no longer be used for draft. This situation has been changing since 1980 when Chinese economy started to rise rapidly. The industrialization of traditional agriculture has been releasing the usage of more and more cattle for draft. Many feedlot operations have also started since then, and cattle can be slaughtered at a younger age nowadays. While the number of cattle is decreasing nationwide, the yield of beef is increasing at the present time. The relatively young beef industry of China entails many opportunities for improvement, especially with aspect to the meat production efficiency.

China has about 78 beef breeds in two categories, Yellow Cattle in the north and Water Buffalo in the south. The top 3 breeds are Simmental, Angus, and Wagyu. There are many other breeds in China that are similar to those in the US. Charolais, Simmental, and Limousin sires are regularly used in terminal cross systems to increase growth and muscling. The local breeds are typically used on the maternal side in their systems. There have already been some new breeds that were developed from the cross breeding systems. Much like the beef operations in the US, location is a key factor in determining which breeds to be used. For example, Brahman is used to improve heat tolerance, parasite resistance, and large body frame. Another bovine species for beef production in China which is unfamiliar to the US beef producers is yak, and there are at least 13 breeds of yak native to Tibet, China. Today, some yak breeds are used in crossbreeding to increase animal resilience to extreme environments such as those associated with Qinghai-Tibet Plateau that is 3,000 meters above sea level.

The Chinese beef industry currently faces three major issues that include land availability, manure disposal, and feed availability. Because of the highly dense human population, the land resource is very limited in China, and the land usage for farming is leased from the government; therefore, the land cost for beef production is very high. Increasing cattle population also increases the yield of manure. Disposing massive amounts of manure is a real challenge. The US beef industry uses large-scale farms and feedlots where the production efficiency is high. However, the production efficiency for large-scale beef production in China is still low. In all, due to high feed costs, a focus for Chinese beef cattle breeding programs is on the ability of cattle to utilize various types of low quality feedstuffs, such as rice stems, sugar cane leaves, and other forages.

Beef consumption in China is growing rapidly. The demand is higher than what its domestic production can supply. Current annual per capita consumption is 5.2 kg as last documented, while the US annual per capita consumption is approximately 30 to 40 kg. If the availability of beef in China increases, the per capita consumption is predicted to increase as well. Without significant improvement in production efficiency, the Chinese beef industry cannot compete against the beef imports from other countries including the US. On the other hand, the current deficit of beef in China offers a great opportunity for other country's beef industry to pick up the slack. The high production efficiency and the increased inventory in the US could provide the US beef industry with tremendous prospects of exporting beef to China.

*The authors would like to credit the first three pictures cited in this report to the beef industry websites of China.

RESEARCH NEWS

By **Dr. Erdogan Memili**

PUBLICATIONS

New Publication led by Dr. Ericka Menezes

Results from our research led by postdoctoral research associate, Dr. Ericka Menezes have been published with full citation.

The study **Proteomic analysis of seminal plasma from locally-adapted "Curraleiro Pé-Duro bulls" (Bos taurus): identifying biomarkers involved in sperm physiology in endangered animals for conservation of biodiversity** led by Dr. Erika Menezes was published in the Journal of Animal Reproduction Science. The publication stems from our collaborative research on bull fertility with Prof. Arlindo Moura of Federal University of Ceara in Brazil.

NEW SCIENTISTS

New Member of Memili Lab

Dr. Erdogan Memili welcomes Mrs. Asma Ul-Husna who is a senior Ph.D. student in the Laboratory of Dr. Shamim Akhter in the Department of Zoology, Pir Mehr Ali Shah Arid Agriculture University in Rawalpindi, Pakistan. Funded through a six month fellowship from the International Research Support Initiative Program of the Higher Education Commission, Mrs. Husna is conducting part of her dissertation research on reproductive biotechnology in **Dr. Memili's** Laboratory in our Department.

DAILY JOURNAL article:

Dairy's decline: Once the economic engine of the region, dairy farmers are a rare breed

By Dennis Seid Daily Journal Jul 2, 2017

Jeremy Graham takes a peek into the 1,000 gallon tank full of fresh milk at his farm in Thaxton. Borden Dairy in Hattiesburg picks up the farm's milk every 60 hours.
THOMAS WELLS / BUY AT PHOTOS.DJOURNAL.COM

THAXTON – Every morning, without fail and no matter the weather, Jeremy Graham wakes up at 1:45. Before his neighbors, before most farm animals, before most of his friends and family in this small Pontotoc County community.

He might have time to grab a quick bite to eat before heading to the milk barn a short drive from the home he shares with his wife, Beth, and their two daughters. By 2:30 a.m., Graham and some of his workers are ready to milk some of the nearly 200 dairy cows of the Graham Dairy Farm.
Fifteen hours later, after a second milking is done, Graham is ready to relax for a bit before the process starts over. After four or five hours of sleep, another day begins.

Graham wouldn't have it any other way.

“I never dread going to work,” said the second-generation dairy farmer. “I look forward to every day coming out here. I may get frustrated at times, but that happens to everybody. The Lord has blessed us. Everything’s been paid for by black-and-white cows and white milk. This is our way of life.”

And it’s a way of life that is dwindling in Northeast Mississippi, which at one time was one of the largest dairy-producing regions in the country.

Today, only a handful of dairy farmers remain in the area. During the peak years of the industry more than a half-century ago, dairy was the mainstay for thousands.
“We are few and far between now,” Graham said. “North of Highway 82, there are maybe a dozen dairy farms left.”

Among them is Taylor Jersey Farm in Prentiss County, about an hour away from Thaxton. Royal Taylor bought the Prentiss County farm in 1977 and moved to it a year later.

He remembers those heady days of dairy farming, when the towering silos, sheds and milk barns were a common sight.

“There were 27 dairies in Prentiss County when we moved over in 1978,” he said. “Now we’re it. The only one left.”

The farm is now run by Taylor’s son and daughter-in-law, Bradley and Carla, who start their days at 5 a.m. and, if they’re fortunate, are done by 9 p.m.

Such is the life of a dairy farmer. The early mornings and late nights are one reason why their numbers are disappearing.

Statewide, dairy numbers are a fraction of what they were. In 1990, Mississippi had 653 dairy farms with some 62,000 cows. The number of farms dipped under 100 for the first time in 2013, and today, only 75 remain.

And fewer farms and cows mean less milk.

In the first quarter of this year, milk production was down 7 percent from the same time a year ago. From January to March of 2016, dairy producers in the state collected 42 million pounds of milk compared to 39 million pounds – or about 4.5 million gallons – this year.

“This was primarily due to a lower number of dairy cows,” said Mississippi State University Extension Service livestock economist Josh Maples. “There are about 9,500 dairy cows in Mississippi – down from 10,000 in the first quarter of 2016.”

The value of Mississippi milk production also has fallen. Last year, production was estimated to be $25 million, down from $32 million in 2015.

A combination of factors have led to the drop-off in dairy farming, but the biggest blow in recent years was Hurricane Katrina in 2005. Nearly 40 farms closed in the following year . Most of the state’s dairy farms are in south Mississippi, and some were so heavily damaged, many producers opted out. Within three years, some 100 farms were shuttered.

From 1990 to 2005, milk production in the state dropped by 50 percent. And production continues to decline as the number of dairies disappear.

With that decline went much of the infrastructure – equipment companies, processors, suppliers, industry specialists and dairy-focused veterinarians.

And time has played a major role, too.

“Like anything else, there are multiple issues about the decline of the dairy industry, but age is definitely a factor,” said **Amanda Stone**, MSU Extension dairy specialist. “The average dairy producer in the U.S. is about 55, and they’re retiring. And they’re not necessarily encouraging their children to take over, or their children choose not to.

“It’s a very hard way of life. You don’t get a day off, you work all the time and it’s physically demanding.”

A LONG HAUL

More than half of the states don’t produce enough milk of their own to meet the needs of its residents. Mississippi is one of those “milk-deficit” states.
The typical Mississippi dairy farm has a herd of 133 milking cows.

Graham has 199 mature cows, about a third more than he had about a decade ago.

“The biggest reason why we’ve grown is that as the number of dairies in Northeast Mississippi have dwindled, it’s gotten harder to fill a milk truck to make it economical to go south,” he said.

Graham’s milk goes to the Borden plant in Hattiesburg, which runs a route that allows it to pick up raw milk every 60 hours.

The Taylors in Prentiss County have 120 milking cows and another 150 young stock.

Dairy farming is a 24-hour, seven-days-a-week operation, as Stone said. Cows have to be milked twice a day, and must be cared for and looked after constantly – much like young children.

“That’s 260 ‘babies’ we have to provide everything for, and it gets tough,” Carla Taylor said. “It’s gotta be done; somebody has to do it.”

The Taylors are part of a dairy cooperative and have their milk picked up every two days.

“We market through the co-op, and they dispatch it to were it needs to go,” Bradley said. “Right now our milk goes to the Prairie Farms plant in Kosciusko. Sometimes it goes to Birmingham, and sometimes it goes to Hammond, Louisiana.”

An independent producer, Graham sells his milk to Borden. But Graham is one of only four dairies on the Borden route, which covers more than 630 miles and 16 hours on the road.

To make the trek worthwhile, farms on the route need to put as much milk as possible on the truck. Graham added more cows – which produce about 5 gallons each per day – to help ensure the Borden’s truck gets an adequate load.

“It’s going to cost as much to run the truck half-full as it does full. Might as well fill it as much as we can and keep them coming,” he said.

Graham’s farm can put 20,000 to 25,000 pounds of milk on a truck, the equivalent of 2,300 to 2,900 gallons.

The rest of the Borden route includes Gallop and Sons Dairy Farm, a fourth-generation producer in Wren, and dairy farms in Montpelier and Philadelphia.

Having more farmers on the route would make life easier – and more profitable – for processors and dairy producers, but the numbers aren’t growing.

THE JERSEY CAPITAL

That wasn’t the case nearly a century ago.

Northeast Mississippi made a big, bold step that eventually led it to become a dairy destination.

The first creamery began making butter in 1912. The first condensery in the state (and in the South) began operations in 1926. The first cheese plant opened in 1927.

Carnation Milk opened a plant in 1927 in Tupelo.

The reason why so many farmers had dairy cows was because of the destruction caused by the boll weevil on the economic mainstay, cotton.

Farmers were advised they needed a side cash crop to supplement cotton. It was an early call for diversification. In Lee County, some 24,000 acres of cotton was switched to pasture land.

The dairy farmers’ milk went to nearby milk plants and other dairy-related operations that dotted the area. There were milk plants in New Albany and in Baldwyn. In Tupelo, Ruff Dairy was the first to pasteurize milk in the area in 1934. Barber’s and Borden’s also later built plants.

But it wasn’t until the late 1940s and 1950s that the dairy industry experienced its biggest boom.

That’s when longtime Daily Journal publisher George McLean and business leaders in the community pooled their money together to buy a prize bull from England. Their aim was to introduce it to the region’s dairy farmers, who would breed better dairy cows.

McLean believed that better cows would mean better milk, which would lead to more money for farmers. That, in turn, would put much-needed cash into the economy.

“We bought 22 heifers and that one bull, which was named Imported Clemance’s Boy,” Harry Martin, who led the Community Development Foundation from 1956-2000, said in an earlier interview. “The community bought it, and it cost between $1,000 and $2,000. That was a lot of money back then.”

The Tupelo Area Artificial Insemination Association started breeding more than 3,000 cows a year to improve the dairy herds across the region.

As the better cows produced more and better-quality milk, it didn't take long for the dairy industry to blossom.

"We were the Jersey Cattle Capital' for several years," Martin said. "Cotton paid the mortgage. But with dairy you got paid every two weeks. That educated children and bought things the family needed. It was supplemental income."

Milk production statewide was the second-highest source of income to farmers behind cotton.

LOWER PRODUCTION

Today, Mississippi is ranked 41st nationwide in milk production, with about 165 million pounds, or 19 million gallons a year.

Seventy years ago, the state produced a staggering 1.4 billion pounds of milk, or roughly 167 million gallons.

In comparison, today's top-producing state is California, which delivers more than 42 billion pounds of milk annually.

But dairy farming has never been easy in the South. The heat and humidity plays a large role in reduced production. The average dairy cow in Mississippi produces about 14,769 pounds of milk a year, or about 1,717 gallons. The national average is nearly 23,000 pounds, or nearly 2,700 gallons.

"It's harder to dairy farm here than other places," Stone said. "Dairy cows get heat-stressed at about 68 degrees, and that's not really hot. We'd like to get as much milk out of them as cows in California, Wisconsin and New York, but they don't have to deal with the heat that we do." Bradley Taylor said when temperatures reach into the 90s during the day and stay in the upper 70s and 80s at night, the cows don't get a chance to cool.

And if the cows are too stressed to eat, they'll produce less milk.

"When it's hot, they don't want to eat, no matter how much you put in front of them. Under the shed and under a fan, you still can't cool them down enough," he said.

Like humans, they like to be somewhat comfortable doing what they do, and the Taylors do what they can with 260 Jersey cows, whether it's during the blistering summer months or the freezing cold.

"They're creatures of habit, and any disruption of their routines also affects production," Carla Taylor said. "We try to keep everything as routine as possible. Happy cows are good cows."

And happy cows produce more milk, of course.

HOPE FOR THE FUTURE

The Taylors, in their 30s, aren't sure what the future of dairy farming may be, despite their obvious passion for the business.

They would certainly like to remain in the business, as long as it remains financially feasible for them to do so.

“It’s hard to say where we’ll be 10 years from now,” Bradley said. “Ten years ago, I could’ve probably told you with certainty. Now, I’m not so sure.”

For those still in the industry, there is some promising news, according to MSU Extension. Producers are paid for every hundred pounds of milk or hundredweight. In April, they were paid $17.97 per hundredweight, up from $16.34 a year before.

In addition, the U.S. Department of Agriculture forecasts higher demand for milk and exports will drive the nationwide average price higher.

But whether the price increase is enough to offset higher input and transportation costs remains to be seen.

Stone said as the number of dairy farms decline, some of the remaining ones will get a little bigger to help compensate for some of the losses. They’ll add more cows, as Taylor Jersey Farm has done, and they’ll find ways to adapt.

“I think there’s a lot of hope. It won’t look like it used to with farms all over the place, but we’ll always have a presence,” she said. “For example, there might be more of a niche market for some. Mississippi has 11 producers with on-farm processing, where they make cheese or bottle milk and sell it, and I see it going toward that direction with some.”

Among those niche dairy farmers is Brown Family Dairy in Oxford, which started in 2009 and sells its milk at farmers’ markets, grocery stores and restaurants across the region.

“There are younger people who are more interested in the processing end of the business more so than the dairy farming aspect, and that’s kind of a cool thing we have that other states aren’t doing as much,” Stone said.

The Taylors and Grahams, remain hopeful, but cautious.

“I’m not so worried about me being economically running the dairy,” Graham said. “It’s whether there’s anybody left around to help me get my milk moved. I’m afraid it’s some other factor outside my control that’s going to put me out.

“But every ounce of hope is still right here in milking cows. That’s every bit of my dream. I hope to be in it until I’m ready to retire and can’t move again.”

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Upcoming Extension Events

Beef Extension – Dr. Brandi Karisch
Cobie Rutherford


- **Stockmanship and Stewardship Regional Event**, **August 3-4**, Starkville MS
- **Homeplace Producers Feeder Calf Board Sale** on **August 7**, Hattiesburg, MS

Equine Events – Dr. Clay Cavinder

- **Upcoming Programs** are online at: **http://extension.msstate.edu/agriculture/livestock/equine/upcoming-programs**
- For more info, contact Dr. Cavinder at **clay.cavinder@msstate.edu**

4-H Events – Dr. Dean Jousan

- **Neshoba State Fall Dairy Show**, July 27
- **Newton State Fall Dairy Show**, July 28
- For publications and upcoming events, go to: **http://extension.msstate.edu/4-h** or contact Dr. Dean Jousan at **dj230@msstate.edu**

Dairy Events – Dr. Amanda Stone

- For publications, go to https://extension.msstate.edu/dairy or contact Dr. Amanda Stone at 662-325-8873.

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2017 Book Chapters:

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