

People & Places

Understanding cattle genes

Brenda and Gordon Murdoch's research goes beyond Bovine Genome

By BRAD CARLSON
Capital Press

University of Idaho researchers Brenda and Gordon Murdoch believe the cattle-genetics roadmap that is the Bovine Genome is good at getting travelers to town but would be more useful if it identified important places to visit.

"There are some genes that have a far-reaching effect on multiple properties of cattle," Brenda Murdoch said. Any given gene, she said, may affect multiple traits in an animal — like feed efficiency, reproductive performance and various measures of growth.

The Murdochs aim to advance cattle genetics understanding, including what creates or drives certain traits. They also want to help increase industry profitability.

In research they expect to publish in late fall, the husband-and-wife team is looking into, among other things, why a cow appears by grade testing to be older than its chronological age, thus fetching a lower price at slaughter. Separately, Brenda Murdoch is part of a group seeking to further map and detail the Bovine Genome in a major study that began recently.

Brenda Murdoch is an assistant professor of animal genomics. Her tools include full genome sequencing, genome-wide association studies and gene-specific sequence analysis. Gordon Murdoch is an associate professor in animal physiology and molecular biology.

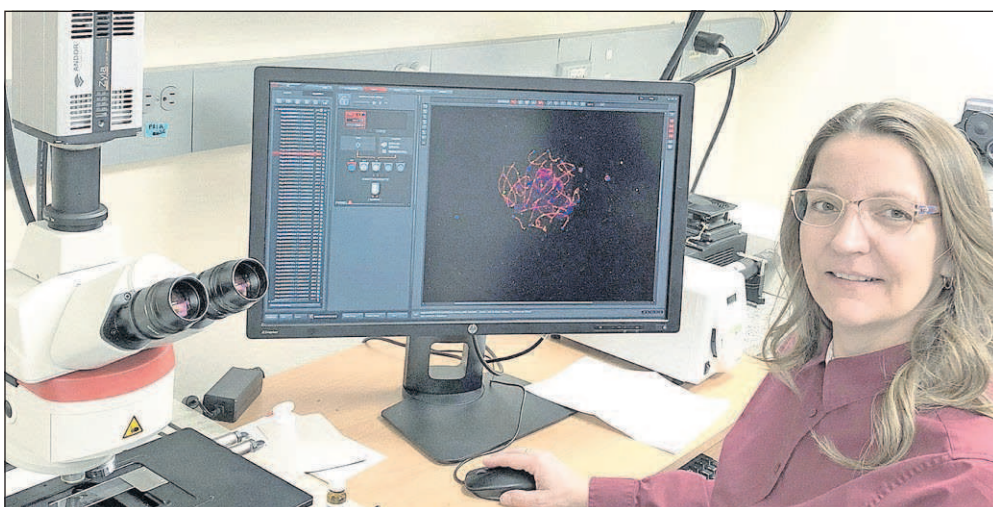
"Gordon does bring a sort of physiological application of the genetics," Brenda Murdoch said. "We are able to bring that together nicely, the genetic and the physiological."

He primarily studies beef. She studies several livestock species.

"She has the expertise to use the most powerful genetic tools to evaluate animals," Gordon Murdoch said. "With my understanding of systemic physiology, often that allows us to put those together and evaluate it in a biologically



Gordon Murdoch in his molecular laboratory using a multi-channel pipette to analyze specific gene expressions for individual cattle. He said the process can be used in the lab to analyze up to 96 animals at once.



Brenda Murdoch at a fluorescent imaging station showing a single cell with fluorescent-stained chromosomes (red) and recombination events (yellow dots).

meaningful way."

Skeletal maturity

They're studying advanced skeletal maturity in beef cattle.

They plan to present some of their data in July at the American Society of Animal Scientists annual meeting, held in Vancouver, B.C., in conjunction with the group's Canadian counterpart. The Idaho Beef Council checkoff program covered about half the project's approximately \$100,000 cost.

"This is innovative because we are right at the prime time of utilizing genetic and physiological tools to advance livestock production in a similar way we advanced from a typewriter to a cell phone," Gordon Murdoch said.

USDA maturity grading has been based on skeletal analysis and, since late last year, a cattle-specific dental examination process called dentition. Now, with many cattle producers tapping breeding databases to select animals that process feed efficiently and grow well, it's

more likely a cow grades older, he said. For example, its bones may look denser than they should for the animal's chronological age.

"Some animals may be graded with an advanced maturity, and that costs money" from producers, Gordon Murdoch said.

If cattle producers indirectly selected for a high rate of maturation, "that speaks to possibly having a genetic cause," Gordon said.

"Some genes are very busy and do a lot of stuff," Brenda Murdoch said. "Some don't, but they are no less important." Much of her gene-mapping work looks at genes driving economically important cattle traits like feed efficiency, meat quality, and disease likelihood.

The study

The Murdochs studied 90 cattle verified by dentition to be chronologically young. They divided them into 30-animal groups graded A for young/optimal, B for slightly older and

C for advanced maturity. They analyzed eight genes known to be associated with cattle maturation processes such as growth, hormone levels and bone ossification (from softer to more dense and hard).

"Just as we hypothesized, we did see some genetic changes in our candidates' genes that are associated with advanced maturity," Gordon Murdoch said. "There is definitely an association between the genetics of an animal and whether they grade A, B or C maturity even though they are chronologically young."

If further such study is done across a larger sample, a genetic test could be developed for cattle producers to use voluntarily, he said. For example, a producer who increasingly sees advanced maturity could use the test to help determine which animals could be at greater risk and, over time, even adjust selection and operating strategies.

"We are never going to advocate single-trait selection, but a test could be designed



Western Innovator

Brenda Murdoch

Occupation: Assistant professor, animal genomics, University of Idaho Animal and Veterinary Science, Moscow, Idaho

Education: Ph.D., University of Alberta; B.Sc., University of Alberta

Gordon Murdoch

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and weighted toward selection of many favorable traits," Gordon Murdoch said. Such testing could even be used to further customize cattle herds suited to different regions.

Brenda Murdoch is part of a multiple-researcher team studying the Bovine Genome as part of a project that received a \$2.5 million USDA grant. She said the recently started five-year project's goal is to map out the genome's functional elements. Earlier research identified many genes and their locations within the genome.

"You can't understand the relationship of genes within the Bovine Genome without knowing where they are within it, Brenda Murdoch said. "This project looks at how to turn off and on all of the genes in the genome. Now we have a pretty good layout of where the genes are in the genome. But we still don't really know what turns them on or off."

Whether the Murdochs research independently or as a team, "the innovation is we are close to delivering useful information to the producer on the farm to a manner and extent we've never had the opportunity to do," Gordon Murdoch said.

Looming trade issue opens doors for Oregon hazelnuts

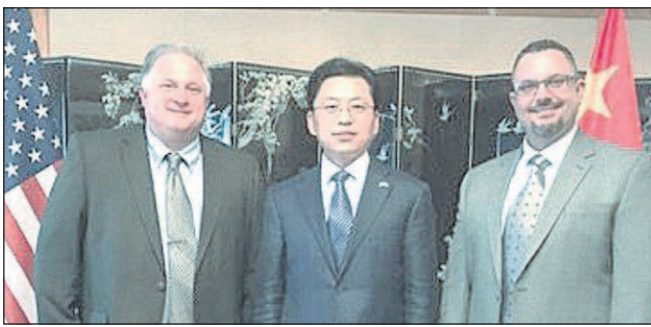
By MITCH LIES
For the Capital Press

At least one agricultural industry is utilizing the possibility of Chinese tariffs as an opportunity.

The Oregon hazelnut industry is hoping that an unexpected communication from the Consulate General Office of China will lead to reduction or elimination of a prohibitive tariff that for years has stripped the industry of direct sales opportunities in China.

"They did not commit or promise anything," said Terry Ross of the Hazelnut Growers Bargaining Association after meeting with Chinese officials. "They just said the door is open, the dialogue has been created, that they look forward to working with us in the future and that they would send a message back to Beijing on our behalf."

The connection between the Chinese Consulate Office



Larry George, left, of George Packing Co., and Terry Ross, right, of the Hazelnut Growers Bargaining Association, meet with Deputy Consul General Ren Faqiang at the Chinese Consulate Office in San Francisco on April 9.

in San Francisco and the Oregon hazelnut industry started inadvertently enough after a news report aired on Portland television station KATU on April 3 about the effects of additional tariffs on Oregon hazelnut shipments to China.

Ross told KATU reporter Joe Douglass that he viewed the short-term trade situation as an opportunity for cooperation. While the Oregon ha-

zelnut industry ships roughly half of its hazelnuts to Asia, the industry for several years has been shut out from selling directly to China because of a 25 percent tariff on its hazelnuts.

"For us the potential for new tariffs was of less concern, because we were already at a real disadvantage to other nuts in China anyway," Ross said. He added that Chinese

tariffs on California pistachios, which directly compete with Oregon hazelnuts in China, are 5 percent, and Chilean hazelnuts enter China duty-free.

Ross told KATU that he viewed the current situation as an opportunity to shine a light on the Oregon hazelnut industry's disadvantage in China and stress the need for cooperation and communication.

The tactic worked better than probably even Ross expected. The day after the KATU report, Ross received an email from the Consulate General Office of China in San Francisco.

"They said, 'We saw your comments and would like to talk further and listen to your opinions and advice on the topic,'" Ross said.

The office invited Ross and hazelnut processor Larry George, of George Packing Co. in Newberg, Ore., to meet with

Deputy Consul General Ren Faqiang and the Vice Consul from Economic and Commercial Office Zhang Taiming.

"Needless to say, we jumped at the opportunity and agreed to make the trip there Monday (April 9)," Ross said. "The China/Oregon ties are historically very strong, so dialogue and communication can only help in lowering the tariffs that put Oregon hazelnuts at a huge disadvantage to other U.S. and Chilean nuts in the Chinese market."

Ross said the two-hour meeting went well.

"It was a very positive meeting. We are excited to continue these discussions and look forward to any future advancement on this issue," he said.

"We also want to thank the Deputy Consul General of China Mr. Ren Faqiang and the Vice Consul Zhang Taiming for inviting us to meet with them," he said.

Calendar

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Friday-Saturday April 27-28

Horsedrawn Vehicle and Equipment Auction. 8 a.m.-3 p.m. Yamhill County Fairgrounds, 2070 NE Lafayette Ave., McMinnville, Ore. Friday, April 27, 2018. Auction starts both

days at 10 a.m. Website: www.pacificoverlandauction.com

Saturday-Sunday April 28-29

Oregon Ag Fest. 8:30 a.m.-5 p.m. Saturday, 10 a.m.-5 p.m. Sunday. Oregon State Fairgrounds, 2330 17th St. NE, Salem, Ore. A two-day event, aimed to help families better understand where their food, fiber and flora come from, is a unique learning experience, where hands-on exhibits make learning about Oregon's vast agricultural industry educational and entertaining. Kids 12 and under receive free admission, and virtually all activities at the event are free

of charge. Cost: \$9 for ages 13 and over. Website: <http://oragfest.com/>

Sunday-Tuesday April 29-May 1

Oregon Cattlemen's Association Midyear Event. Sunriver Resort, 17600 Center Drive, Sunriver, Ore. Speakers include governor candidates, attorney Karen Budd Falen, Scott Yager of the NCBA and Ethan Lane of the Public Lands Council. Register at <http://bit.ly/2FQEHZ3> Website: <http://orcattle.com/>

Monday, April 30

When Animals Die, Dealing with Livestock Mortalities on the Farm.

5:30-8:30 p.m. OSU Southern Oregon Research & Extension Center, Auditorium, 569 Hanley Road, Central Point, Ore. This class offers an overview of the various ways of dealing with animal carcasses. Cost: \$25 one/\$35 two from same farm. Website: <http://extension.oregonstate.edu/sorec/SF-classes>

Changing Hands: A Workshop on Farm Succession Planning and Access to Land. 7:30 a.m.-5 p.m. Sprout! Regional Food Hub, 418 A St. Springfield, Ore. The workshop will bring together aspiring and retiring farmers for a full day of training on land access and succession planning. Cost: \$20 Website: www.roguefarmcorps.org/planning

[roguefarmcorps.org/planning](http://www.roguefarmcorps.org/planning)

Friday, May 4

Blue Mountain Seeds Open House. 1-3 p.m. Alicel warehouse, 65569 Highway 82, Alicel, Ore.

Tuesday, May 8

Water Rights 102: Irrigation Districts in Oregon. 7-8:30 p.m. Hermiston Community Center, 415 S Highway 395, Hermiston, Ore. April Snell, executive director of the Oregon Water Resources Congress, for a water rights workshop covering the basics of irrigation districts in Oregon. Cost: Free. Website: <https://oregonwater-coalition.org/events/>

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