VOL. 2 ISSUE 11 · DECEMBER 2022

CATTLECAL NEWSLETTER

ANNOUNCEMENTS

Welcome to the CattleCal newsletter for December 2022! In this issue we have exciting information on research and activities completed this month, the career and research of Dr. Meredith Harrison, lead scientific advisor for C-Lock Inc., and a look at a research paper on dairy production, feedlot performance, and carcass characteristics when crossing beef x dairy cattle. If you would like to hear more detailed conversations about the articles in this issue, look for our CattleCal podcast on Spotify. Descriptions of this month's episodes and a link to the podcast can be found on page 3. If you have any questions, comments, or would like to submit a question for our Quiz Zinn segment, feel free to contact us. Our contact information can be found on the last page of the newsletter.

This issue:

THIS MONTH IN RESEARCH

We wrapped our two projects up in mid-December. Below is the performance for the final 48 days on feed. Our February 2023 newsletter will have a more detailed summary of performance and carcass data from these studies. In November/December, average temperature was 57.2° F (18° F less than October), average maximum temperature was 73.2° F (17° F less than October), and average minimum temperature was 42.5° F (20° F less than October).

DAYS 280-328 PERFORMANCE SUMMARY

	Holstein	Crossbred
Body weight (d 280)	1224 lbs	1236 lbs
Body weight (d 328)	1402 lbs	1417 lbs
ADG	3.67 lbs/d	3.76 lbs/d
DMI	26.6 lbs/d	25.9 lbs/d
F:G	7.24	6.89

October 2022

December 2022

CATTLECAL PODCAST DECEMBER EPISODES

Career Call - CCP#080

This week Brooke Latack and Pedro Carvalho called Dr. Meredith Harrison, lead scientific advisor for C-Lock Inc., about her background getting involved in the beef industry, the difficult decisions made, and her current position working in with precision agriculture technologies.

Research Call - CCP#081

This week Brooke Latack and Pedro Carvalho speak to Dr. Meredith Harrison again to discuss her PhD research related to using technologies to predict dry matter intake and potential commercial feedlot benefits when using this technology.

Feedlot Research Call - CCP#082

In this episode, join Pedro Carvalho and Brooke Latack as they discuss a research paper on dairy production, feedlot performance, and carcass characteristics when crossing beef x dairy cattle.

Quiz Zinn - CCP#083

In this episode, we asked Dr. Richard Zinn about lysine requirements and supplementation of feedlot cattle.

Listen on Spotify at this link:
https://open.spotify.com/show/6PR02gPnmTSHEgsv09ghjY?si=2zV59nGbSE2mf8DiOqZLhw

Have any questions, comments, or suggestions? Want to send in a Quiz Zinn question? Contact the creators through the below email or through their social media profiles.

- Email: cattlecalucd@gmail.com
- Website: cattlecal.sf.ucdavis.edu
- Instagram: @cattlecal

QUIZ ZINN

Can you discuss lysine requirements for feedlot cattle and methods of supplementation?

Requirements

The 2016 Beef NRC dropped the metabolizable amino acid section the NRC 2000 put in. That was unfortunate. I think the problem is that most of the cattle on feed are either light or heavy yearlings. Maybe they didn't see the important surge in calf fed cattle that we see today. When you're talking about calf-fed cattle, then metabolizable amino acid requirements become very important. It's interesting that both methionine and lysine are often co-limiting amino acids. The reason for that is that most feedstuffs are either a very poor source of methionine or a very poor source of lysine. It's very difficult to find a supplemental protein source that would balance both in the methionine and lysine at the same time. What's interesting is that all through the whole growing and finishing periods, for all cattle, the metabolizable amino acid requirements for lysine and methionine pretty much stay the same. Once cattle are on feed so that they're growing according to their genetic potential, the metabolizable requirement for lysine (whether they're a calf or a long yearling) is about 40 grams a day and the requirement for methionine is about 12.5 grams a day. That's important because then you can see that you could actually balance the formulation to meet that and forget about the crude protein or metabolizable protein requirements for both calves and yearlings. The problem is that lysine has two amine groups on it, and is very, very susceptible to damage, especially from heat. For example, in distillers grains the lysine content of distiller's grains is quite variable. In fact, most of the distiller's grains that we get here at the Research Center are about 30%-40% higher in lysine than the standard shown by the NRC. This can vary depending on the source and the amount of solubles that are added back to the protein. During the drying process, who knows what's happening to the lysine. We might have an analysis that shows a lysine content, but we're not sure how much of that lysine is actually available because of the Maillard browning reaction where you have a glycosylation of susceptible amino acids. Lysine is one of the most notably susceptible amino acids to that reaction.

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When temperatures get to about 140 degrees F or higher, then we're starting to see that browning reaction. The color of the distiller's grains, for example, can be very important in terms of how that material was dried. This would be true for other sources where the material was high in moisture and was dried back. Because a lot of people nowadays when they're formulating are using distillers grains, they can bring that protein level of the diet up fairly high, but they will never meet the lysine requirements or will be unlikely to meet the lysine requirements. Because of this, it's very difficult to expect that that would be achievable. This this makes for a very difficult situation. It turns out that soybean meal is very high in lysine, but it is rather low in methionine. You're going to run into a problem. You can put as much soybean meal as you want in the diet, but you're never going to meet or it will be very difficult to meet the methionine requirement with just soybean meal during the early phase when the animals aren't eating that much feed.

Methods of lysine supplementation

Meeting lysine requirements is very difficult. You can buy protected amino acids. That's a method of bringing the lysine as well as the methionine up to an acceptable level. There's still some uncertainty about the actual ruminal escape value of these protected amino acids and so we have to be really careful in trying to determine if we're accomplishing that. Natural sources that are very high in lysine would be blood meal. Blood meal is extremely high in lysine and it has a very high bypass value. Because of the way it's dried down and everything else, the availability of the lysine in blood meal can be very low, particularly if it's flash dried or some of the older processes. The best source would be fish meal, but fish meal has become very, very expensive, so that's going to be a challenge. The only really practical way to meet the requirement for lysine during the early phase would be some form of protected amino acid. This would be the most likely way of meeting that requirement.

Having said that, you could do blends that could be a blend of distiller's grains, which are an excellent source of methionine, with some hydrolyzed blood meal (or something like that available on the market), for example. That would be another way of bringing it up besides using strictly a protected amino acid. Another method would be some form of protected soybean meal, which would bring the lysine up.

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QUIZ ZINN

Besides price, what are the main considerations that you see when we include fish meal and blood meal in a diet?

In the case of fish meal, it's not very palatable, so you can't really go above 4% fishmeal without affecting feed intake. There's an upper limit on how much fish meal that can be added to the diet. Blood meal is very palatable, there's not really much of a problem with blood meal. You just need to be very careful on the source of the blood mill. How it's dried down it's going to be very, very important.

How many days on feed should someone be supplementing cattle with lysine and methionine?

If we're talking about calf-fed cattle, these calves are going to come in a little bit heavier. Let's say they're coming into the feedlot between 300 and 400 pounds. At this stage in their growth, they have a tremendous growth potential. We're feeding them a very high energy diet in order for them to achieve that potential. In the process of feeding them out, we run into a weight where the animals energy intake now is so great, because of the maintenance requirement and everything going up as they get heavier, that really the possibility for a limitation would be zero. I'm going to say that probably up until the animal reaches around 700-750 pounds, they will benefit from supplementation. After that there's no way. Generally what we do is in 112 days, they're going to reach around 680-700 pounds from around 300 pounds. That's the basis for the 112-day idea. That response that we get during that period will usually carry through the whole feeding period. It is very beneficial to try to work towards getting that kind of a response.

Microbial protein

With flake corn, microbial efficiency is going to be much greater. We're going to have much more microbial protein, and microbial protein is a good source of methionine and lysine. The type of fermentation will also impact that, so whatever we do to maximize microbial synthesis will also play a role. We're going to see a better response with flaked corn than with round corn or cracked corn.

CAREER CALL WITH MEREDITH HARRISON

We speak to Dr. Meredith Harrison, lead scientific advisor for C-Lock Inc., about her background getting involved in the beef industry, the difficult decisions made, and her current position working in with precision agriculture technologies.

Where are you from and what do you do?
I am originally from Columbus, IN which is about an hour south of Indianapolis. I wasn't raised in an agricultural setting at all. Both of my parents worked for Cummins Diesel Engines. I came to agriculture later in life. I just recently finished my PhD at the University of California Davis in animal biology with an emphasis in feedlot cattle production systems. I just started my new position as lead scientific advisor at C-Lock Inc. They're based in Rapid City, SD.

How did you get involved in agriculture?
I didn't grow up on the farm or anything. I lived in town. I was fortunate enough to get to own a horse, but I boarded that horse. I showed in 4H and was active in FFA but not really on the livestock side of things. I went to school, and I knew I wanted to major in animal science, but as an incoming freshman I had no idea the opportunities that you could do with an animal science degree. It seemed like most of my peers wanted to go to vet school. I knew that wasn't the course that I was personally interested in. It was when I was taking a course at Colorado State University, where I did my undergrad, that was entitled Live and Dean Evaluation. We would do live animals on a Monday where there was a class of four you would evaluate like if you were at a livestock judging competition, and then in the lab portion on Friday those same animals would be hanging as carcasses, and you would get to see if your predictions were true. That was the moment that I really realized there are people out there that are scientists where it's their job to produce our meat supply. That was really what started my interest in livestock production. I went on from there to intern in the meat laboratory at Colorado State and got to work on a couple of unique projects with grad students. That opened the door to graduate school and continuing my education.

Why weren't you interested in the veterinarian route like many animal science students are?
I knew I wanted to work with animals. Maybe at one point I had aspirations of being a horse trainer or something very different than what I do now. Naturally I just decided on the animal sciences not knowing what I would do with it. I always envisioned more on the marketing side of things.

Why did you decide to go out of state for your undergraduate education?
I decided to go out of state for undergrad. If I stayed in Indiana, I probably would have gone to Purdue. Both my parents went to Purdue. It's a great university. I just wanted to get further from home.

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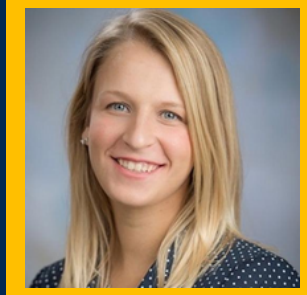

No shame to my family. I love them, but I just wanted to get out a little bit. I actually started at Oklahoma State and then I ended up transferring to Colorado State. That's something else I would encourage people to do. If you're not happy in one university, look into others. Transferring is a great thing.

You mentioned that the carcass evaluation class really got you interested in meat production. Is that what pushed you to work in the beef industry?

Initially I was very passionate about the meat science side of things. I still am. I love to cook, so I think the desire to look at steaks and whatnot went hand-in-hand. I really had an interest in the meat side of things. I looked into pursuing a master's degree in meat science. I interned at the JBS Greeley beef harvest facility and I worked on the grade chain there. I did a couple of different projects as an intern. That was a great experience. During that time working as an intern was really when I realized that once the cattle come to the plant, they are what they are, and we don't have any ability to make changes. That's going to be further up the supply chain. That was what shifted my interest from meat science to the actual feedlot production area. I pursued my master's degree in beef cattle production systems. That was broader going from cow-calf to the feedlot sector. I eventually specialized in feedlot research for my PhD.

Why did you decide to go to grad school? You had a gap between your master's and PhD programs. Can you tell us what you did during that time?

I didn't always know that I wanted to go to grad school. I interviewed with JBS directly after my internship and looked at going into their training program working for them. Grad school wasn't an easy decision. Ultimately for my long-term goals I saw for myself, I was really interested in research. To be able to make a career with research was really going to require some further education. That was why I went to pursue my master's at Colorado State. After finishing my master's, I went to work for Five Rivers Cattle Feeding. I worked as a technical services analyst for them based out of their corporate office. I was fortunate enough to get to spend a lot of time at the Greeley feed yard doing everything from driving feed truck and feeding cattle. I have some funny stories about that. I'm sure people there have some funny stories, too. I got to work with the feeding department and the milling department. I did a lot of analyzing for large scale research trials. That experience has been very invaluable to my ultimate research as a PhD student and then future career.

How was it coming from industry and a full-time job to going back to school to do your PhD?

It was so hard. I remember the time of year it was that I was trying to make the decision. Before I took the position with Five Rivers, I had applied to UC Davis. I thought I had made peace with it that I was going to go work for Five Rivers. Ultimately, I changed my mind. Just thinking about goals I had for myself, that was a huge thing. As an undergrad I didn't really think, five years down the road or 10 years down the road, what I wanted to accomplish. It came back to needing that PhD.

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CAREER CALL WITH MEREDITH HARRISON

The thing that eventually pushed me over the edge and had me willing to commit to going back to school, taking that pay cut, which is a hard thing, going back to not having your weekends free, and just working all the time (everything that comes with a grad student) was finding a really good mentor. That was something that was really important for me. I was fortunate enough to get to work with Dr. Jim Oltjen at UC Davis. The ability to have full autonomy over my project and my program and getting to do the research that I wanted to do was what sold me. As a master's student, I didn't get to choose my project. I was very passionate about it, but the PhD really afforded me the opportunity to dig into some research interests that I personally had.

How important were mentors to your education and career? How would you recommend students seek out mentors?

The earlier in your academic career and your professional career that you can find a mentor, the better. I didn't really have a consistent mentor until I got to my master's program. If you are an undergrad listening and you can find one sooner, that's great. Some strategies that I would use is finding a common research interest. Making sure that you guys are interested in the same thing. Try to find someone who is open to your learning style and how do you receive feedback. Everybody's different. I'm a self-guided learner. I don't like someone that micromanages. I like someone that's willing to give me a little freedom. Try to make sure that the mentor of your choosing aligns with your philosophies and your learning methods. That's really important. If you can connect with them on a personal level, I think that makes it a lot easier to approach them with different kinds of things. Just networking in general is huge even if someone isn't exactly your mentor. Along those same lines, mentors from a variety of settings is good, too. I had Dr. Oltjen, obviously, as my academic mentor, but my boss during my time that I worked at by Five Rivers, Dr. Tony Bryant, has been a great mentor, as well. Trying to find people from a variety of fields and different backgrounds with different perspectives is only going to help your development.

Can you tell us what it was like finishing your PhD and looking for a job? Did your network help in your job search?

I got this job while I was still trying to finish up my PhD. It was really motivating to get things wrapped up. It's just good to finally be done. The initial decision I had to decide was industry versus academia. I applied for both types of positions; faculty positions at universities as well as positions like the current one that I currently have. I've always heard different perspectives from different mentors on which you should do and why. There are some misconceptions that it can be hard to go back to academia if you go industry first. Some of my mentors were really pushing the academia route which was hard because I didn't end up going that way. Those thought processes are something that's important to talk about with people who are going out looking for jobs. Have an open mind. I wasn't committed one way or the other. I entertained both options. It came down to where I see myself five years from now and my current interests right now. Ultimately, this industry position with C-Lock Inc. was perfect for me.

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CAREER CALL WITH MEREDITH HARRISON

Can you tell us a little about what you do in your current position?
My title is lead scientific advisor. I've only been with them for two weeks. I'm in a unique position that I get to work with our sales and marketing teams helping to make recommendations for clients and help bring new clients on board with scientific information and different studies that have been done. I really need to stay current on all the literature. I have a very strong analytical background so I will be doing some different modeling work with big data trying to combine these data streams from our multiple pieces of precision livestock equipment to paint that full picture for producers. What I really like about this role is that I'm still involved in research even though I am in industry. I get to collaborate with a variety of industry, academia, and government agencies. There are a lot of different opportunities, which I think is pretty unique.

What has been the biggest challenge so far?
It's a lot of new stuff to try and take in at once. I have really high expectations for myself so just trying to slow down and get the lay of the land. I thought I would be doing some really fancy modeling things here on my second week. I have been learning from people and taking it all in and know there is time. That has been an adjustment for me. As a PhD student, it seems like we're juggling so many projects at once and now I have a lot less on my plate. Just trying to learn and navigate the new role. South Dakota weather is pretty challenging, too.

What has been your favorite thing about the position so far?
The opportunities, the vision for the company, and getting into some of these commercial spaces are really what excites me about the opportunity. To know I'm making a difference. If you ask me this question months from now, I could probably say it a lot more eloquently, but I'm just really excited for new opportunities with this new position.

How has your internships and connection with industry helped you get where you are today?
My industry connections helped me get where I am today. Initially, that internship that I had with JBS really propelled my whole career. It was recommendations through them and my master's advisor that I was be able to get in with Five Rivers. With those connections I was able to do some different consulting work through my PhD. Work with a Blue Ocean Barns and Precision Livestock Technologies, which are awesome startup companies. It's really coming back full circle and we'll get to hopefully collaborate with people down the road. Those industry connections and internship opportunities are the most important thing for some of those undergraduate listeners. Take opportunities. Maybe you have to get your foot in the door somewhere and do some of the grunt work, but the grass is definitely greener on the other side.

Is there anything else you would like to mention about your career?
Keep your LinkedIn active. That sounds silly but that's actually how I got my job with C-Lock, Inc. They found my profile and they reached out to me. Make sure you're keeping up on it even if you're not looking for a position. You just never know what might come out of it.

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CAREER CALL WITH MEREDITH HARRISON

That really goes back to networking and going to conferences and meetings. As an undergrad I really felt like I was shy to be seen as asking a stupid question. There are no stupid questions. People are always happy to talk to young students. Network and introduce yourselves to people.

What is your favorite food?
That's tough. A Nashville hot, fried chicken sandwich. It's from Nashville, TN. It typically has coleslaw and pickles on a bun. It's very good. That's probably my favorite food.

When you are the cook, what is your favorite food to cook?
I'm very good on the BBQ with a smoker, so maybe some smoked ribs or brisket. That kind of thing.

What kind of music is usually playing on your radio?
I listen to all kinds of music. I admit recently it's been a lot of classic rock kind of stuff.

What is something you know now that you would like to go back and tell your younger self?
Get comfortable being uncomfortable. There are a lot of times in your career that you're going to go through growth and changes and it's not going to be comfortable. But it's necessary. It's going to get you further ahead in your career. Along those same lines, set goals. That's something I never really did for myself until I sat down with a mentor, and they asked what my goals were short term and long term. What are the steps that I was for those actionable goals. That was a process I hadn't really done. Since I have started doing that, it's a nice way to track where you came from and track progress. Set goals for yourself and then it's fun to look back and see what you've accomplished.

What is your CattleCal top tip?
There is a Netflix show that I really liked. it was Michael Pollan's "Cooked". I mentioned I really like cooking and it talks about cooking with the four main elements. That's a very unique series. On a more nerdy note, I would recommend, especially for younger listeners, to really let yourself enjoy statistics. I hated statistics as an undergrad and now I really love statistics. Give it a chance even if you hated it early on. It will get you very far in your career if you can know something about statistics and be able to interpret it. Brush up on your statistical prowess.

How can people follow your work and contact you?
LinkedIn: linkedin.com/in/meredith-harrison-phd-1b15451b9
Email: mharrison@c-lockinc.com

RESEARCH CALL WITH MEREDITH HARRISON

We speak to Dr. Meredith Harrison, lead scientific advisor for C-Lock Inc., about her PhD research related to using technologies to predict dry matter intake and potential commercial feedlot benefits when using this technology.

Can you tells us about your PhD research and how you came up with the research idea?
Precision livestock technology is a hot topic right. A lot of interest but not a lot of research on the economics of using these technologies and what it means for producers. I wanted to take a deeper look at that. I'm a firm believer in that you can't manage what you don't measure. These new technologies are really affording us abilities to evaluate individual animals in a pen in a way that hasn't been commercially possible before. With that, I wanted to look at a commercial pen of cattle and look at implementing a technology. In this case it was bunk cameras that we were using. Trying to use bunk cameras to characterize dry matter intake, feeding behavior, aggression, etc. Just all of that feeding dynamic that occurs in conventional feedlot cattle.

It looks like you were able to work with industry in your project to get the technology you needed. How was it working with industry during your PhD?
You're exactly right. I was working with a company called Precision Livestock Technologies that has developed this camera technology. It had a lot of really great things about it and a lot of challenges as well. Having someone outside of the university to serve as a mentor really kind of checks and balances to make sure the research truly stayed applied and wasn't just researching for research's sake. It was great to have that industry perspective. At the same time, there are different dynamics working with industry. One of the challenges about working with industry is that the timelines are not always going to line up with the university setting. Universities tend to move little slower having to get all the approval and then industry oftentimes wants results really quickly. Trying to find that happy medium was definitely one of the challenges.

Were there any surprising results you found or surprising uses for the technology?
We wanted to use these cameras to evaluate individual animals in a commercial setting. Initially it started with bunk management and evaluating the time of slicking and smart feed calls but it just didn't really work with the configuration of our feedlot and how our feedlot was managed being a smaller research feedlot. I had to pivot. We went from that approach to trying to quantify individual animal feeding behavior. One of the challenges was how we were going to individually identify all of these animals in a conventional pen. We were able to accomplish that using Estrotech patches on these steers. We covered them in unique color patches and unique combinations so that the cameras could find them. Working with the company, we were able to develop some algorithms to individually identify animals and keep track of their feeding behavior. We validated those algorithms using some of my undergraduate interns. Ultimately, we were comparing that back to some of the feeding behavior of animals that were measured in Insentec individual animal feed monitoring system similar to GrowSafe.

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RESEARCH CALL WITH MEREDITH HARRISON

Some of those comparisons between the systems were pretty unique and pretty surprising. For example, both groups spent about the exact same amount of time eating but cattle in the conventional bunks tended to visit the bunks a fewer number of times but stayed at the bunk for longer each visit. There's likely a social hierarchy that is playing a really big role into some of these feeding dynamics, which I thought was pretty surprising.

What type of camera were you using? Are they being applied in a commercial yard?
We have seen a couple different versions at our feedlot at UC Davis. We were able to start with the company when they were pretty young. The cameras themselves are awesome. They're pretty inexpensive. They're not 3d cameras or anything fancy, but what is unique about them is that these cameras actually have a Linux computer in them. That's what enables them to hold all of these images and capture things. I could access that camera feed from anywhere. When I was on campus in between classes and I wanted to be able to check on my research cattle, you could pull them up right there on your phone. You're really able to get some pretty powerful analytics as the company has grown. They are installed in commercial feed yards. That's something that we're starting to see. They really offer unique analytics on feeding behavior more so than you could get from your conventional bunk reader, even if you're reading the bunk several times a day. This is continuous, real-time monitoring. It's something that's really unique and will start to allow new insights on how we feed cattle on a commercial level.

What are some of the difficulties in applying these technologies in commercial yards?
We may start to be able to develop more advanced marketing methods by collecting this this data. Historically, a lot of producers have just marketed their cattle based off of visual appraisal. How they look, what the pen average weight is, etc. In addition to cameras like these at the bunk, there are also cameras that can quantify cattle body weights. You could start to get an idea of what animals weigh. Since we're measuring continuously, then you can quantify your average daily gain. If you're measuring some of these feeding behavior things, soon we will be able to better individually estimate dry matter intake. Right now, we're just dividing the feed call by the number of animals in the pen, which is certainly imperfect. With accounting for individual animal body weight and their growth pattern and their eating behavior, we can get a better idea of that animal's actual intake which would really allow you to develop customized economic profit curves and determine at what point is feeding these cattle no longer profitable and really advancing the marketing side of things. On the flip side of things, it'll allow us to make a lot more progress towards feed efficiency. Monitoring residual feed intake is not really done at a commercial level due to the fact that we can't measure feed intake. It would really allow us to start moving the needle on efficiency.

Is the technology to a point where producers can use the technology on their own or do they still need someone to help with interpretation of the data the technology is collecting?
That's always the challenge to take actual hard data and then transfer that into what it means for the producers. There are some opportunities there. Right now, we're still in that advanced algorithm stage. Once we start to really establish those, we'll hopefully be able to develop more of what I would call a decision support tool. Something that is readily usable by producers.

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RESEARCH CALL WITH MEREDITH HARRISON

Is there one technology you see as being useful right now to producers?

Some of my research and some historical research by Hicks back in the 80s has really shown that if we monitor dry matter intake for the first 28 days, you can get a very good projection for that animals dry matter intake through the entire feeding period. As we're thinking about implementing some of these technologies, it seems daunting. In a 50,000 head yard, how do I try to implement this across the yard. Really focusing on some of those receiving pens to quantify early on then those benefits will pay off through the whole feeding period. That's an opportunity I see for commercial implementation and that's obviously when your animals are the highest risk, too. You'll have the greatest incidence for illness at that period, so having some extra cameras and set of eyes on those pens could really take off.

Moving from your PhD work to your current position working with precision technology, what do you plan to carry forward?

I did a lot of research on feeding behavior. Monitoring individual animal dry matter intake. That's something I'm pretty passionate about. Exploring our smart feed technology and continuing some of these growth prediction and dry matter intake prediction models is huge. Also combining that data with smart scale data which enables us to track individual animal weights multiple times a day. Determining all of that real time data change our growth projection. I did a lot of work with the UC Davis growth model as well in my PhD studies. Something that I haven't really worked with was measuring enteric methane emissions. C-Lock Inc. offers a product called the Green Feed Machine where we can measure CO2, O2, and methane. Combining some of those data streams with intake data and weight data to get a full picture of the model. We could develop some correlations. Just having all of these different data sources on the same set of cattle provides a lot of unique opportunities from a data mining correlational perspective. The biggest opportunity I see for research is really to develop a greater understanding of the cause and effects that we see with these different feeding behaviors. Now we're able to measure all this stuff but what's going on within the animal that is driving some of these different efficiencies. Lots of research that could be done.

FEEDLOT RESEARCH BRIEF

Dairy, feedlot, and carcass performance when breeding dairy cows to beef semen

Introduction

- Dairy and beef semen sales were steady from 2013-2017
  - In 2020 beef semen sales were up by ~5 million units and dairy semen sales were down by ~5 million units.
  - Since most dairy animals are bred via AI and beef are not, this change can be attributed to dairy breedings
- Based on US dairy production standards, ~ 5 million dairy or beef x dairy crosses may end up in the US beef supply.
- Actual numbers of dairy x beef crosses slaughtered are not recorded, but packers have stated that the number of crosses has increased.
- We need to better understand the impact of beef on dairy crossbred animals on carcass and meat characteristics.

Materials and Methods

- Dairy
  - Data from two dairies collected (at least 500 cows per dairy)
  - Both dairies used conventional dairy semen and conventional beef semen
  - One dairy did not select cows to breed to beef semen based on productivity. The other dairy bred high productivity cows to dairy semen and low production cows to beef semen.
  - Only multiparous cows were analyzed
  - Evaluated cows bred to only Holsteins over two breedings and cows that were first bred to Holstein semen and then bred to beef semen the following year.
- Feedlot performance
  - Closeouts for beef and beef x dairy cattle collected from feedlots
  - Most cattle were fed a high concentrate diet, given two hormonal implants, and fed ractopamine 30 days before harvest.
- Carcass performance
  - Carcass data from beef, beef x dairy, and Holstein cattle collected from processing plant

Results

- Dairy
  - Gestation length was 2-3 days longer for beef sires compared to dairy sires
  - Calving interval tended to be up to 15 days longer for beef sires
  - Cows bred to beef semen had lower total milk yield, average daily milk yield, and peak daily milk yield
  - Cows bred to beef sires had less of a decrease in yield from lactation one to lactation two, potentially due to decreased susceptibility to mastitis
- Feedlot
  - Beef x dairy cattle were less feed efficient in the feedlot and had a lower dressing percentage than beef cattle while producing more yield grade 2 carcasses and fewer yield grade 4/5 carcasses.
- Carcass
  - Beef x dairy had leaner carcasses than beef but heavier carcasses than Holsteins
  - Beef cattle had greatest hot carcass weight
  - Beef x dairy had less back fat than beef cattle and a larger rib eye area than dairy cattle.
  - Yield grade was not different between cattle type
  - Beef x dairy and dairy had greater fat trimmed from the carcass compared to beef cattle.
  - A larger percentage of beef cattle graded select compared to beef x dairy and dairy cattle.
  - More beef cattle carcasses were yield grade 4 compared to beef x dairy and dairy cattle.

Conclusions

Only calving interval may affect dairy management. Production was not changed when breeding beef to dairy. Growth performance was affected very little aside from feed efficiency. Beef x dairy crosses may be an optimized average between beef and dairy breeds. More work is needed to identify these trends with newer genetic advancements and different management strategies.

CONTACT

Have any questions, comments, or suggestions? Want to send in a Quiz Zinn question? Contact the creators through the below email or through their social media profiles.

- Email: cattlecalucd@gmail.com
- Website: cattlecal.sf.ucdavis.edu
- Instagram: @cattlecal

Creator contact:

Dr. Pedro Carvalho, Assistant CE Specialist in Feedlot Management at UC Davis

- Email: pcarvalho@ucdavis.edu

Brooke Latack, UCCE Livestock Advisor - Imperial, Riverside, and San Bernardino Counties

- Email: bclatack@ucanr.edu

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