VOL. 1 ISSUE 7 · SEPTEMBER 2021

CATTLECAL NEWSLETTER

ANNOUNCEMENTS

Welcome to the CattleCal newsletter for September 2021! In this issue we have exciting information on the effect of mud on feedlot cattle performance, the career and research of South Dakota State University Professor Zachary Smith, and a look at a study examining the effect of steroidal implants on Holstein steer performance, carcass characteristics, and serum and tissue E2 concentrations. 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

This month we continued our two research projects as well as collecting respiration rate data. We weighed cattle to get an idea on performance over the past two months. Cattle performed very well. In August we saw average maximum temperatures of 105° F and average minimum temperature of 79° F.

PERFORMANCE SUMMARY

Body weight (d 139)	787 lbs
Body weight (d 195)	985 lbs
ADG	3.35 lbs/d
DMI	17.0 lbs/d
F:G	5.22

August 2021

September 2021

CATTLECAL PODCAST SEPTEMBER EPISODES

Quiz Zinn - CCP#025

In this episode, we asked Dr. Richard Zinn about the effect of mud on performance of feedlot cattle.

Career Call - CCP#026

This week Brooke Latack and Pedro Carvalho called Dr. Zach Smith, an assistant professor at the Animal Science Department at South Dakota State University. Zach is a great friend and an awesome person that has a very nice story to share.

Research Call - CCP#027

This week Brooke Latack and Pedro Carvalho called Dr. Zach Smith an assistant professor at the Animal Science Department at South Dakota State University. He shared information about the effects of "Bedding Applications to Feedlot Steers", and some other research that he is conducting at SDSU

Feedlot Research Call - CCP#028

This week, Pedro Carvalho and Brooke Latack discuss research looking at the effect of hormonal implants on Holstein steer performance and the payout period of those implants.

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

What is the effect of mud in feedlot pens on the growth performance of cattle?

Surprisingly, as important as this question is, it has never really been addressed directly in any type of scientific investigation. There have been some anecdotal assessments on this. The question is very complicated. We need to understand that the effect of mud itself has received very little research. That's unfortunate.

To begin with, when we talk about heat stress, we're looking at an ambient condition where the animal is having trouble removing the heat load it has from its maintenance requirement, tissue production, and from the heat increment from the diet itself. This is a tremendous heat load. As ambient conditions increase and become more severe the only option the animal has is to reduce its energy intake to reduce the heat load it has to eliminate. When ambient temperatures are about 98.6°F (36°C) the animal can only eliminate the heat load by the process of perspiration or respiration. Very little heat is lost through convection once ambient temperatures are increased. In the desert southwest and areas with high ambient conditions cattle are going to be provided with shade. This will eliminate the radiant heat load, which is tremendous. The radiant heat load will be maximized from about 11 am to 2 pm even though ambient temperature may continue to increase throughout the afternoon. What the animal is going to do to accommodate the situation is reduce its activity. You'll see animals under these conditions lying down and they're going to be under the shade. Because of this animal grouping beneath the shade, there's a high possibility for an increase in the amount of moisture in the manure under the shade. The anecdotal answer that is generally considered is that if you have about 2" (5 cm) depth of wet manure under the shade, then there is no effect. As that level goes beyond 4-8" (10-20 cm), then you have some reduction in dry matter intake. If it goes above 8" (20 cm) you can have a very high reduction in dry matter intake. This reduction can be difficult to assess but it can be as much as 15-25%. This is a serious problem. The anecdotal concern is the reduction in dry matter intake.

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The accumulation of mud under the shade doesn't increase surface temperature. In fact, the surface temperature may be less with wet manure under the shade. The problem is when the depth is above 8" (20 cm) we run into a serious problem of mobility. Some animals may become injured and become lame. There could be some foot disease issues as well. The main concern is the mobility issues. They can become stuck, especially heavy cattle. When I was young working at a feedlot I was cleaning drinkers and jumped over the fence and went all the way to my waist. They had to rescue me and come pull me out. I couldn't get out of it because it was that bad. That's why they put concrete pads around the drinkers and feed bunk to help the animals move around and not get stuck in those areas.

I would say that the major problems with mud are lameness/mobility and dry matter intake. One of the problems I have that makes it difficult to assess this without doing a study is that the accumulation of mud is directly related to the space under the shade. You cannot separate mud from space under the shade except for maybe a drinker overflowing. Generally speaking, the greater the amount of shade the more the cattle can spread out under the shade so there will be less moisture accumulation under the shade. We see a lot of feedlots in the Imperial Valley, Mexicali Valley, and other areas where their pen population exceeds the recommended. In those areas you can clearly see the problem under the shade. A lot of cattle will be standing, and you will see a lot of wet manure accumulation in the shade. The issue is very difficult to separate the amount of shade. Normally we would say 2 m2 (~20 ft2) of shade per head is the convention that is considered a good amount of shade but we're seeing that we may need to have more than that. Maybe 3-3.5 m2 of shade per head.

Some feedlots in the Midwest or High Plains have a serious problem with mud. You can see a lot of mud all over the animals. Have you ever had a problem when looking at closeout data of the cattle looking heavier just because they have mud all over their body?

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That's a very important point. This is an especially important issue in the wintertime. This can cause problems with animal performance. With the mud on the hide, the animal loses the insulation of the hair coat. In the High Plains and Midwest, this is a spring and winter problem that's not so common in the summertime. Having said that, not just when you're marketing the cattle for harvest but also when buying the cattle, it's not a good idea to get cattle out of a mudhole when buying from a sale barn. We want them to be well groomed and dry. Today, virtually all cattle are sold on a grid. This may be confusing for feedlots as they often calculate their breakeven using the sale weight, which would be confused by a lot of mud being on the animal. Today they will have that carcass weight so they can make an adjustment and do the calculations based off that. On all our research we adjust back to the carcass weight so that these issues like fill, horns, mud, and a lot of other factors can be removed. A lot of feeders are interested in why their cattle don't yield well and a lot of the time it's not an issue with nutrition, but an issue with a marketing condition at that point in time.

Another point to make for feeding cattle in the Desert Southwest is that even though we don't get a lot of rain, the animals under the shade are urinating a lot. Especially those Holsteins.

That's the reason why we need a lot more shade with the Holsteins. They drink a lot more water. They will drink between 70-130 liters of water a day depending on their weight. Some will drink more than others. Some will drink just to cool off. They'll drink water, stand under the shade and urinate, go drink more water, etc. That's why you can see some pens that are dry and some look like a lake. There may just be certain animals causing a lot of mud. You don't see as much mud accumulation with crossbred cattle like you see with the Holsteins.

CAREER CALL WITH ZACHARY SMITH

In this month's career call we spoke with Dr. Zach Smith, Assistant Professor at South Dakota State University about his background and some great tips for young researchers.

Where are you from and what do you do?

I'm Zach Smith. I'm the fifth of six children of Steve and Jan Smith. I come from a really big family. I was born in Little Rock, AR, raised in Orlando, FL until 8th grade, moved to West Texas where I went to high school where I met my wife, went to college at Texas, did an MS degree at South Dakota State, and then went back to Tech and did my PhD. I guess I'm from the South. I'm transplanted to the Northern plains and somewhere along the way I ended up about dropping the wake board, fishing poles, and skateboards and moved over to livestock. I'm an assistant professor in animal science at South Dakota State University. I have an appointment that's 70% research and 30% teaching. I get to spend a lot of my time training graduate students and conducting applied research in feedlot cattle management and nutrition of confinement fed cattle in a northern plains.

When and why did you decide to start working with cattle?

I honestly don't know how I ended up here. We've all had good mentors, right? And everyone knows a few people that stick by your side and really help you get through tough times and they're there for you no matter what. One of those mentors was my MS advisor Dr. Robbi Pritchard. A lot of people know Dr. Pritchard. One time he told me to follow the Lightning path. I didn't know what he was talking about. He was talking about getting where you're going with the least amount of resistance. I was also motivated to do things. All through college I did the wool judging team, the meats judging team, and livestock judging team. That's really where I found my friend and it kept me out of trouble. Those were my people. I wanted to be a meats judging coach. So bad. I was going to be the greatest meats judging coach ever because I had some good success in meats judging. I graduated college and it just didn't turn out that I was going to get the opportunity to be a meats judging coach. I think I mature a little bit. That was frustrating. My two best friends became meats judging coaches. I enrolled as a graduate temporary student and I'm still hooked up on meat science. I remember in class coming up through college when they talked about feedlot nutrition it just never seemed attainable. They're way up there, there are just a few of them, never attainable, they're never going to die. That's what I really thought. We are very small industry, which is so cool. The rule of two or three is so real. If you know two people, you're connected to everybody. The way you act in public, the things you do and say are noticed. You have to be professional. I was thinking I would never get into this feedlot deal. I got a call to come visit South Dakota State University (SDSU) to become a T.A. (graduate assistant), but there was no advisor. When I visited SDSU I got to Dr. Pritchard's office and the rest was that I got to work with him and I had a good time.

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CAREER CALL WITH ZACHARY SMITH

How did you get into livestock? Did you grow up on a farm?

No, I grew up skateboarding and roller skating at the skate park. When we moved to Texas I got chickens. After I had chickens I got pigs. After I had pigs I got lambs. I never actually got cattle. I didn't mess with cattle until I got to college where I just did the judging teams. It wasn't until I got to Graduate School that I actually went to my first weigh day or fecal/rumen collections or anything. I would say the foundation of the chickens, the pigs, the sheep, getting involved in FFA, and livestock judging set me up to be ready to go to college. Then I joined the wool and livestock judging team. And then everybody goes and gets a job, I guess. I wasn't ready to get a job. I knew I wanted to be a meats judging coach. When that didn't work out I had to find Plan B. Plan B was South Dakota State. I had an opportunity to work with Dr. Pritchard. It totally changed the trajectory of my career path. I joke about it now, but I would probably be doing meat color right now. I don't think it would be as much fun as what I get to do now.

Through life my parents always knew I was either going to be able to be a functioning member of society or get in trouble. I was just wired like that. I wasn't that good at sports. My little brother was a good athlete. I played sports because being a team member was important and it was fun. I wasn't very good, but when you do something not very good long enough, you get decent. And that's what happened. At one time I wanted to be a pilot. In high school my best friend had his pilot's license. Even before that when we lived in Florida I had gone flying at the small airport and took a few lessons. By the time I was 16 I was taking lessons to solo. That's what I was going to do. Once I got the club lambs it took away my time from flying. I really wanted to be a careerist pilot, but I got the lambs and an it just totally changed everything. It was not planned. This was what I was supposed to do about 15 years ago.

Your PhD mentor and I were talking last week. We talked about how dedicated you were to your work, showing up to graduate classes and being at the library.

That was a special situation. I had graduate the semester before. I'm now this grad temp student. All these other grad students had legitimate assistantship responsibilities. I was just taking seven hours of classes and I got to go to the library nerd out. That really gave me an opportunity to read things front to back. I was walking in with ammo. I was probably more prepared than the average student. I'm glad I had that semester because it was an opportunity there. After that semester I moved to South Dakota. After having class with Dr. Johnson he told me that if I went and did my MS degree then he would have a spot for me no matter what. It was that was a good feeling. It's always good to know where you're going once you're done.

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CAREER CALL WITH ZACHARY SMITH

How important have mentors been to your career and how do you apply that to your students?

I had some mentors at the undergraduate level. Dr. Jackson. He's one of those professors at Tech that taught entry level animal science classes and some capstone courses. He was the person I looked to the most at that time because we both had an interest in sheep. Moving on you get involved in judging teams and those folks served as mentors. When I think of a mentors, it's someone that I wanted to emulate. This first true mentor was Dr. Pritchard. He had quite a way of training us. The answer was never given right away so we always had to do some hunting. I like that. It really made me grow as a person. I have the same kind of respect for my mentors as I have for my dad. My dad could tell me to jump off a bridge and I would because I know he loves me and I trust him. I feel the same way with my mentors. They don't give me bad advice. When they are honest with me and I think they're being mean and it hurts, I always just think whether they like it or not they are your mentor so they're going to help. There are other mentors that just happened. I like to think that I don't like to talk to people, but I do like to talk to people about what we're doing with our work. And I like my colleagues. I talk to anyone really, but I get nervous and get social anxiety. That was when I was a little younger before I moved from into my professional life. I will say that being on the judging teams did help me get ready to talk to different people, but it didn't get rid of the social anxiety of going and talking to someone that's more important than me. The first time I did that I was at a feeding quality forum and I went and introduced myself to someone that was a really important person in the industry. I introduced myself and gave him my business card. He ended up coming through Lubbock and called me to have supper. That person has been a mentor to me as I finished up graduate school, finding a job, moving into my career, and even helping me in my life. That was an unofficial mentor that I hold as the same kind of respect as my formal mentors.

When it comes to graduate students, this is unique and something I'm learning. Every grad student is different. We're running a machine. You start with just a few and now we are training seven students. We have a good group of older PhD students and some senior and incoming master's students. So, it's not like they're all incoming students. Some students can really take the pressure. I like putting pressure on students to feel deadlines. Really, all grad school is is to control the environment so the student can make mistakes. I want the student to make mistakes and think about what critical step they missed in making that mistake. You never learn anything when it's smooth sailing. I have learned the most in adversity. There are different types of students: those that can handle adversity and those that can handle it but need motivation. I have had to learn that what I can do to one I can't do to the other. The easy way to get students through and get papers published is just to not tell the students and just let everything slide, so I always remind myself and my students that I push them because I care about them and want to hold them to their best level. I need to be held at that level and be held accountable. My students help me there. A more difficult master's program makes the PhD a cakewalk. You go in like a colleague at that point working together. I thought the PhD was so much fun.

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CAREER CALL WITH ZACHARY SMITH

Can you tell us more about your current job and some challenges that you have faced, especially in the beginning?

I have a family, so I set some boundaries with the family. I don't work after 5 pm. Grad students are low maintenance. Undergrads require more work in the sense of email correspondence so I will respond to emails later, but I won't sit at the office after 5. I might take home something that I want to read after everyone goes to bed when I sit and watch the news. I try not to work at home or on the weekend. I have done decent on time management to not have to work a lot of weekends. That's one thing when I was a grad student and didn't have a family, it was just research and I would do it all day. I want to pick my son up from day care and drop him off. When it's October when we have receiving calves in one feedlot and yearlings in come to another feedlot two weeks before the newly weaned calves so theirs three weeks of weigh days, so those days I don't take my son to daycare. Those issues just happen so you need a supportive family to do the job. One thing I always do is look at the advanced action articles for journals. That's how I keep up with that. When I was a grad student I felt like I could read a lot more. I got to spend a lot more time reading journal articles. I like reading about things that I'm working on. . I don't sit down and read novels, but I will read scientific articles about things we're working on, are of interest, or could be of interest. I really lost that ability to read everyday. For a while I lost my way. I thought I was out of touch with the information. First it's the experiments, then it's writing the manuscripts. They don't teach you how to write a grant. I had to learn that on the fly. Built some documents. I came into a working system. The feedlot had the bones, so that helped out a lot. Some people don't like writing. I don't love writing but I do like getting the information written and in tables. I really enjoy technical reports, but I don't like long, flowery reports. I have to be patient with the graduate students on processing the data, which I do along with them while they learn to do it, but within a few weeks of the end of a project I want a short 3-page write up of the experiment that I send to the director of the experiment station. We get everything down on paper while it's fresh in our mind since we may not write the manuscript until a year later.

How has it been working with the cattle industry in South Dakota?

The South Dakota cattle feeder is unique. It's not just South Dakota, but this region. It's not what I grew up around and it's definitely not what cattle production is down in the desert Southwest. South Dakota has really great cattle. The feeder cattle are incredible. The opportunity to go to one ranch and get 300 bawling steer calves that were born within 60 days in one cut is not something you can do anywhere else. Its really awesome. Those make for special cattle that we can have a lot of fun with. That's why I love it here. It's really fun in the sense that we are not just cattle feeders. Every cattle feeder in South Dakota are integrated crop and livestock farmers. They don't just count on selling row crops to the elevator in town and they have increased resiliency to poor crop conditions. This year 10% of South Dakota's corn crop is rated as poor to very poor. That means we're chopping it as corn silage. Well, if you don't have cattle it's really bad. The cattle industry allows them to market a failed crop as a feed. It's not very good corn silage, but you can still grow cattle on stover and a little bit of corn. The integrated livestock system is really cool. It's challenged me to have to learn new things.

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CAREER CALL WITH ZACHARY SMITH

In Texas, I was raised a livestock judging kid. I didn't know much. I knew what gain was and feed conversion and carcass weight. I didn't understand systems resiliency. We are smaller in scale. Quite a few of our feedlots wouldn't be captured in the census data since they're under 1000. We feed about 500,000 cattle annually. We export a lot of feeder cattle out of the state. If you drew a 115 mile circle around Sioux Falls there are nearly 2,000,000 head of cattle on feed. You have to learn corn yield and how to calculate corn yield to estimate silage yield. They're things you don't always learn in grad school. With a discipline in animal science we don't learn the principles of crop production and agronomy. South Dakota is definitely ranching on the west side and smaller farms on the east side.

What is your favorite and least favorite part of your job?

My favorite thing is when you start a new experiment, and the cattle are being brought it. It feels like I'm playing football and walking down the tunnel before a game. I still get that feeling then and when I get a manuscript accepted. It's just really big joy. I live for those feelings. I love getting studies started and seeing the culmination of our work and it being able to be shared with other people. Those are the joyful parts of the job.
The non-fun parts of the job are preparing for lectures. I hate making powerpoints.

How did you overcome your challenges with talking to others?

I'm not a shy person. I want to pretend I don't like being around people, but I like talking and visiting with people. I get anxiety with certain people. For example, Dr. Larry Cora. He's a big deal. The first time I met him I was too nervous to go up to him and introduce myself. That was stupid of me because he is a great guy. The next time I was around him, I actually introduced myself to him. We hit it off right away. Don't ever be scared to that person that you are intimidated by. They were probably like you at one point. Just go for it. What's the worst they will do? Worst case is that they are busy. Best case you meet someone you can correspond and communicate with. Those people are great resources.

What is your favorite food?

I love Mexican food. I really like street tacos and fresh stuff. I'm a cheese enchilada connoisseur. I like my cheese enchilada to be topped with fajita beef to get the steak on there. We don't buy steaks at restaurants because I feel like I'm the master griller. Our favorite at home would be sweet corn, steak with just salt, and all of the fixings.

What's usually on your radio while you're in your car?

When I'm in the car I listen to talk radio. I bounce around between all of the stations and try stay fair and balanced. In college I really liked Texas country, red-dirt music. I'm a 90's baby, so I went through an emo phase, so I like Fall Out Boy and All American Rejects. I only listen to music when I'm with my wife. At work I don't listen to music. It just distracts.

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CAREER CALL WITH ZACHARY SMITH

What do you like to do in your free time?

I don't have a lot of hobbies. I wish I did. My older brothers like to hunt. I like hunting with my family but I don't go hunt public land or anything. I really like my job. I really like hanging out with my son. When me and my wife go do things we just miss our kid. We have another baby coming. When the kids get older we would like to have 4H animals. Me and my wife like eating. We're foodies.

Looking back, what is something you would tell your younger self?

I just recently had a life changing experience. I live a long way from my folks and my parents were in a bad car wreck a few weeks ago. It scared me. Really, really, really scared. Looking back, I did my PhD 2 hours from home but didn't make it home enough. If I could go back I would have gone home more, not just around the holidays like I had done. I thought I was busier than I was. When you live so far away, the time home is so special. Just sitting on the couch all day with them. I saw my folks more when I lived 1,000 miles away than when I lived 2 hours.

What is your top tip for our listeners?

There's a really good paper by Dr. Fox introducing people to the California Net Energy System. It was in the Colorado Feeder report in the 70's. It's not all of the updates that we have now but it is a good read for starting out students.
A System of Predicting the Feedlot Performance of Growing and Finishing Cattle. Fox et al. (1977)

Aside from that, anything that you want to read more of, keep reading it. Stay current in the literature. If you look up what journals are putting out every day, you will know what people are doing in real time.

How can our listeners keep up with your work?

Website: https://www.sdstate.edu/directory/zachary-smith
Email: zachary.smith@sdstate.edu

RESEARCH CALL WITH ZACHARY SMITH

This week we continue our conversation with Dr. Zach Smith discussing his work bedding cattle pens in the winter and it's effect on performance of feedlot cattle.

Can you go through how you came up with this project and how you did it?

This was the first project I got to do as a faculty member. It's nerve wracking. Is it important? Is it going to matter? I had all sorts of ideas and this definitely wasn't one of them. My wife (at the time just my girlfriend) asked if we bed the cattle. She's thinking of it as something nice for them to lay on. Immediately my wheels started turning about the cost/benefit of this. Obviously we need to put it out there, clean it up, and all these things. When I came back from the California Net Energy System Symposium in 2018 I had been a faculty member for a month. I came back with all of these crazy ideas thinking about how I'm going to make a difference in the world. I go and have coffee with Dr. Pritchard and tell him what my ideas are and he just smiles and says, "I've already done it." I wanted to compare cattle fed in Texas and South Dakota and he and Dr. Preston had done this in the '90's. It was written up in a beef report but never published. When Dr. Pritchard started his job, his job was to continue to improve cattle feeding in South Dakota. He was interested in the difference. Obviously, cattle fed in South Dakota had poorer feed conversion when they looked at close outs, but feed costs were cheaper. He took a set of heifers from one ranch and pre-conditioned them in South Dakota. He sent half to Texas and the other half halfway to Texas and brought them back. The cattle were fed the same diet. They looked at feed conversion. The Texas cattle ate less but gained the same. South Dakota cattle had poorer feed conversion. I was interested in applied energetics, so I took the step with that data to repunching in all of the raw data. I reanalyzed all of the statistics. The cattle in Texas met expectations, but the cattle in South Dakota did worse than expected. I ended up calculating the maintenance coefficient based on tabular NE values for ingredients. The South Dakota cattle had an elevated maintenance cost of 38%, which was the same level as the bedded cattle when I bedded them. So, winter time feeding in South Dakota has elevated maintenance cost. I started doing stuff with lower critical temperature. People may be familiar with growing degree days with corn, which is the temperature difference between the lower growing temperature threshold for corn and the accumulation of degree units. I was going to calculate what I was calling "misery days," but if the South Dakota chamber of commerce heard that they would stop it, so I called it critically cold days. I haven't followed up on this, but I was trying to figure out what is cattle's critical temperature. It's different if they're dry or wet or have a winter coat and what's the temperature outside. When it's below that, then it's a critically low temperature accumulation. Then I wanted to try to see how many of those cattle accumulate in a given period and see if I could predict the change in observed maintenance coefficient. I'm working on that still.So, that was all the start of this project. When my wife asked about bedding my mind went back to how it would alter maintenance cost. I got interested in it and that's the route we took with it. So, my wife's idea, all the little things I learned, reading literature, talking to Dr. Pritchard, and grad school really put it all together for us to do the bedding study. We did it on a cold winter. It was unbelievably cold out.

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RESEARCH CALL WITH ZACHARY SMITH

How did you approach the question of bedding for this project?

Bedding is used in certain facilities when it's needed. It's not often used in open lots. It creates issues with getting mixed into the mud. Our feedlot on campus is a concrete open lot, so there is no mud. We approached the bedding situation in way so that at any given time there would be enough bedding out there for all of the calves in the pen to have a dry spot to lay down. That changed. If it was wet out we put bedding out. If it was dry out we didn't put bedding out. Some weeks we bedded three times and some weeks we didn't bed for the whole week. Overall, the bedding we applied in the finishing study (experiment 1) was about 4 lbs per day. In the next experiment we used just as much bedding in the pen but we had more head per pen, so they got less per day. They also weren't as big and didn't produce as much manure or urine as the animals in the first study so the bedded conditions lasted longer. A problem with feeding cattle in South Dakota for research, and especially for native cattle that carry a lot of hair, is that over winter, even when we bed, they accumulate a lot of hide.
Dr. Luther had a grad student remove tags from the cattle one winter and they had about 100 lbs of tag on the outside of the animal. My meats judging coach mentioned that while he was working in Nebraska he found a 600 lb hide covered in mud. When they get that tag and the hair loses it's insulator capacity, its essentially like concrete. Going from winter into May, I have to write notes down on weigh days because they will lose all of their hide tags. They will lose 100 lbs of tags in a 30 day weigh period, so they will have a 0 average daily gain. Just as a note of something I noticed that it would be good for people to know about, I had a study with 5 head pens and 8 head pens. The 5 head pens stayed a lot cleaner. When I was tracking those cattle, the cattle in the middle weights exceeded expectations throughout the entire study until all of the tags fell of in the spring. The reason the gain was exceeding expectation was because of the mud accumulation. This was only seen in the 8 head pens. The 5 head pens were not accumulating as much mud since the pens stayed cleaner so they under-performed to expectations. It's just something I noticed.

What happened when you bedded vs non-bedded pens? What were the benefits?

So, in this manuscript there were two studies. The first one was weaned calves that had been grown and we brought them into the feedlot and stepped them up to a finishing diet. Those cattle were placed in January. In that study, in the first 36 days the cattle that had bedding weighed 35 lbs more than the non-bedded calves. They held onto that through the entirety of the study. The other cattle never caught up. The non bedded cattle took an extra 35 days to finish at a similar body weight of the bedded cattle. It came down to different days on feed. On the second study we had bawling cattle that we took straight from the ranch. These calves were on the prairie Monday morning, the left the ranch Monday at noon, got to the feedlot Monday night, and Tuesday they were in a pen with or without bedding. Those calves without bedding gained the same but ate more, so they had poorer feed conversion. Based on live weight, non-bedded cattle had a greater amount of hide tag accumulation. So, the live weight gain for unbedded calve could just be due to tag accumulation. Without knowing carcass weight we don't really know the true efficiency of how they use that energy. In a growing study we aren't carcass adjusting weight.

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RESEARCH CALL WITH ZACHARY SMITH

Can you explain why they were performing better?

I can't give the cattle a survey about how they felt or how they liked laying in the bedding. I did take a video. I'm not an expert in this and I can't read animal emotion, but the cattle look different. If I showed this video to you, you'd see the difference. I need to find a way to explain this with numbers. If we want to implement this in every feedlot in South Dakota, they're going to want to have more than pictures. I chose to evaluate this purely based on maintenance. I don't believe that cold stress alters retained energy, so I put all of my faith in the maintenance adjustment. It really is all the same math whether you're looking at a dry matter intake ratio, gain ratio, or maintenance coefficient. We chose to express these using the maintenance coefficient. Over time I'm building a data set of all the studies I complete. I'm putting in month of arrival, month of harvest, and calculating maintenance coefficients and performance ratios to see if I can target some aspect of a season or when the cattle are placed. Like a lot of people say, you can't manage what you can't measure.

What's next? Is there any plans for the future?

People should know that my MS is in beef cattle feedlot management. My PhD was muscle biology. I was doing gene and molecular biology. I thought that's what I was going to do when I started my job. I was going to integrate that into the feedlot stuff, but those weren't the needs of the stakeholders here. They needed applied management, integrated crop/livestock information. We've published some data on hybrid rye. Rye is a really unique crop to the state of South Dakota in the sense that it gives us a third crop in a rotation. Wheat has been that crop for a long time but there are some issues with wheat with some producers that want to find another crop to move onto. Rye is really useful in the sense that it's seeded in September/October, gets established, overwinters, and then you can get a forage crop in the spring or a grain crop in the summer. What we're trying to figure out with rye is how it fits. The first study we did with rye we did a complete replacement of corn with processed rye. We figure out that the NE value of rye was about 86% the NE value of corn. When we blended it with corn and rye we got a positive assistive effect of different type of starched fermenting differently. When we fed the complete replacement we had a reduction in intake and all the other things associated with that. Then I did a study with a complete replacement of corn with unprocessed rye. Processing rye is a pain because it's really small. Most of our processors have one roller or a hammer mill. A hammer mill will make it too powdery and with a roller mill the gap didn't work with rye. Whole rye didn't work. Whole rye had a energy value 10% less than processed rye and 78% of the value of corn. We figured out that if the 1200 acre farmer-feeder who's always done 600 acres of beans and 600 acres of corn adds a third crop rotation, that can break disease pressure and weed pressure. This rye can choke out water hemlock. O

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Our agronomist found that you can get an increase in the corn yield with a third rotation of rye. That increase in yield produces enough extra corn that the 1200 acre farm can have 200 extra head of cattle a year just by adding rye. The hybrid rye is different than open pollinator rye in that it nearly doubles yield. When we fed a diet of 2/3 corn and 1/3 processed rye, it fed almost identical to 100% corn. Now what we're going to test this February is what is the discount if we do not process the rye if it is fed at 1/3 of the diet. It's just a way to get it into the diet and get it fed. I think you can do a lot of things replacing 1/3 of corn with a small grain. I think it would be safe, but I have to test it. We're going to continue to do things with feed one growing-finishing diet to steers in the northern plains. I have one more round of my low moisture molasses stress tubs for newly weaned calves. We're going to be busy.

Experiment 1: February 26, 2019. Average ambient temperature = -1°F and average wind chill = -7°F

Experiment 2: May 10, 2019. Average ambient temperature = 47°F and average wind chill = 47°F

Experiment 3: November 6, 2019. Average ambient temperature = 21°F and average wind chill = 18°F

FEEDLOT RESEARCH BRIEF

Effect of steroidal implants on growth performance, carcass characteristics, and serum E2 in calf-fed Holsteins in the feedlot

Introduction

- Steroidal implants have been used to improve beef cattle growth performance and feed efficiency for over 50 years.
- With much of the implant research conducted on beef breeds, a focus of those technologies on Holstein steers is critical.
- Especially important as Holstein represent 16% of slaughter cattle fed in the US.

Methods

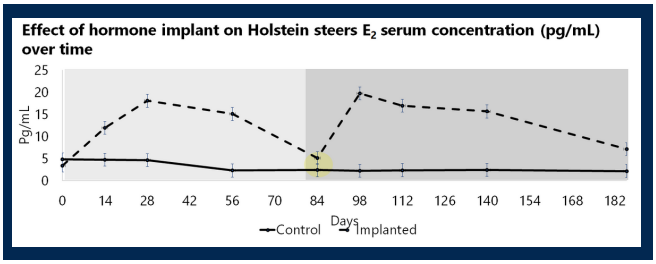
- 70 Holstein steers (605 ± 12 lbs) were blocked by weight and sorted into 2 pens (35 steers/pen) for a 186 day feeding trial.
- Treatments:
    1. Implanted on day 0 with 80 mg of TBA + 16 mg of E2 and re-implanted on day 84 with 120 mg of TBA + 24 mg of E2.
    2. Not implanted.
- Steers were adapted to the same diet (table 1) in a stepwise adaptation process.
- Weight, feed intake, and serum E2 concentration were collected throughout the feeding period.
- Carcass characteristics were collected at harvest.

Results

- Over the entire feeding period body weight (10%), ADG (20%), hot carcass weight (11%), and LM area (6%) were all greater for implanted cattle compared to non-implanted cattle.
- Implanted steers had 1.3 pg E2/g more E2 residue in the LM tissue.
    - Unlikely to have human health concerns at this level.
- Serum E2 levels were similar at day 0 for both treatments but was great over the rest of the feeding period for implanted cattle.
    - E2 serum levels for implanted cattle was maximized 28 days after the first implant and 14 days after the second implant.

Table 1. Composition of diet fed to Holstein steers

Ingredients, % DM basis	
Cracked corn	65.8
Corn silage	17.0
Dried distillers grains with solubles	15.0
Mineral and vitamin supplement[1]	2.0
Urea	0.2
Analyzed nutrient composition, % DM basis	
Dry matter	71.9
Crude protein	11.8
Neutral detergent fiber	23.1
Starch	53.7
Calculated composition[2], Mcal/kg	
NE_m	2.07
NE_g	1.41



Implications

Implanting calf-fed Holstein steers improved final body weight, ADG, HCW, and LM area compared to non-implanted cattle. Implanting cattle with a more aggressive implant strategy had similar payout period to previously reported payouts in beef cattle breeds; however, the initial, more mild, implant had a shorter payout than that previously reported in beef breeds. Simillar to beef from beef breeds, beef from hormone implanted Holstein steers are extremely safe for human consumption.

CONTACT

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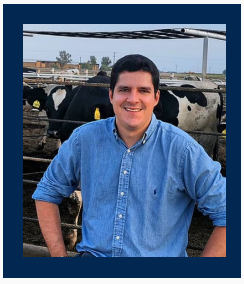

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