

VOL. 1 ISSUE 3 · MAY 2021

CATTLECAL NEWSLETTER



ANNOUNCEMENTS

Welcome to the CattleCal newsletter for May 2021! In this issue we have exciting information on slow-release urea in feedlot diets, the career and research (using beef semen in dairy cows) of Penn State beef extension specialist Dr. Tara Felix, and a look at a study using phase feeding to improve growth performance of calf-fed Holstein steers in the feedlot. 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.



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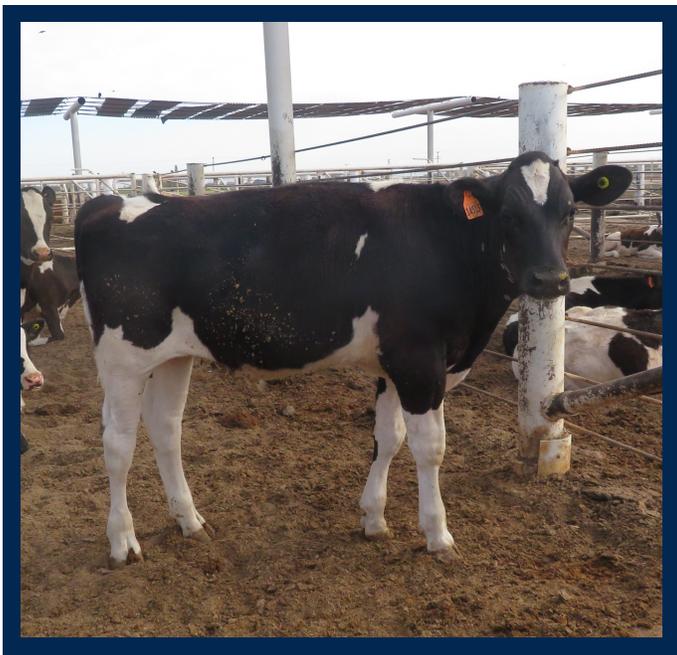
THIS MONTH IN RESEARCH

The steers on trial had great growth this past month. Below you will find performance data for these calves. In April we saw average maximum temperatures of 90° F and average minimum temperature of 55° F, though several of those days did get above 100° F. We will be finishing our study on metabolizable protein (100 calves) in late May and look forward to starting those calves on a new study. Our other study with essential oils will be continuing until the calves are finished.

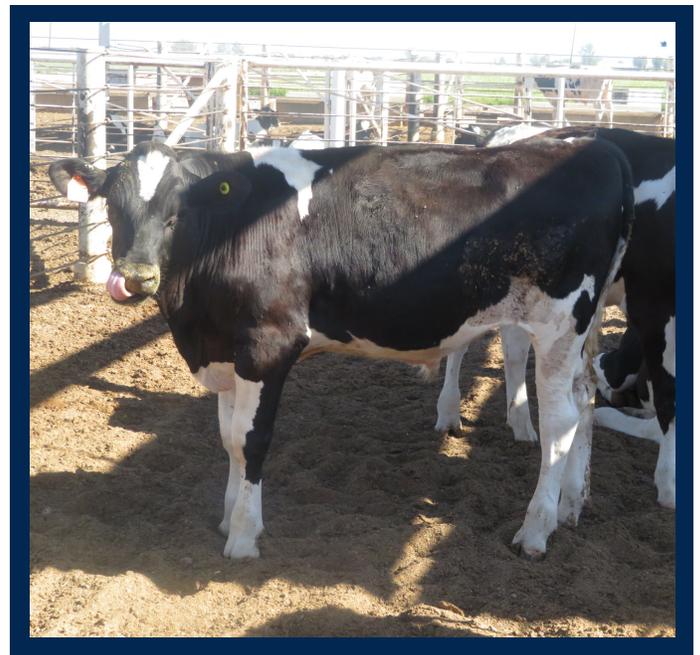
PERFORMANCE SUMMARY

Body weight (d 55)	454 lbs
Body weight (d 84)	555 lbs
ADG	3.60 lbs/d
DMI	14.0 lbs/d
F:G	3.89

April 2021



May 2021





CATTLECAL PODCAST MAY EPISODES

Quiz Zinn - CCP#008

In this episode, we asked Dr. Richard Zinn a question from our listeners related to the use of slow release urea in feedlot cattle diets.

Career Call - CCP#009

In this episode we talk to Dr. Tara Felix, an Assistant Professor and Beef Extension Specialist at Penn State University. Dr. Felix shared a lot of nice stories about her career, a time that she spent in Russia during undergrad, at the end, she left us with a lot of great TopTips to think about career and life as well!

Research Call - CCP#010

In this episode, we called Dr. Tara Felix from Penn State University. Dr. Felix discusses her research project that she is currently developing and her perspective on the use of beef semen on dairy cows.

Feedlot Research Call - CCP#011

In this episode, join Pedro Carvalho and Brooke Latack as they discuss a study looking at phase feeding strategies to meet metabolizable amino acid requirements for calf-fed Holstein steers.

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



During our last research call we discussed urea supplementation. We received one question related to that:

What is the potential benefit of using slow release urea, or protected urea, in feedlot diets? Do you think there is a benefit based on the buffer capacity of ammonia in the rumen or when animals are fed less ruminal digestible starch, such as in Brazil where cattle are consuming predominately cracked corn instead of flaked corn?

Slow release urea for microbial efficiency

This is a very good question. The idea of efficient utilization of non-protein nitrogen, like urea, in the diet has been a subject of investigation for many years. Researchers have attempted to address the concept of synchronization of nitrogen availability in the rumen with the microbial growth and this has led to so many published studies trying to show that synchronization is beneficial. Unfortunately, it has not been possible to demonstrate that. In other words, going back 40 years where researchers have infused urea at a continuous rate throughout the day and compared that with one single dose of urea into the rumen and have shown no difference in microbial efficiency, the amount of net protein synthesized in the rumen and entering the small intestine. This addresses one aspect of urea supplementation to meet the requirement in the rumen of nitrogen for microbial growth. The difficulty of this is that these studies were unable to show a difference in nitrogen balance. Even the idea that continuous infusion of urea throughout the day would result in less nitrogen loss to the environment isn't valid. This has been a real stumbling block in trying to address that.

Urea toxicity

Back in the 1970's, there was concern for urea toxicity. It's the idea that when we supplement urea it is released very quickly in the rumen. There's a possibility that there may be an excess amount of urea in the diet, whether from an issue in the feed mill or some other issue. The belief was that with a slow-release urea supplement, there would be fewer problems with urea toxicity. Urea toxicity is a real issue for a feedlot, but it would be rare. The relatively small likelihood of urea toxicity makes it so the prevention of urea toxicity by slow-release urea would not pay the additional cost of the slow-release urea.

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QUIZ ZINN



Recycling to meet microbial requirements

When urea is fed, even though it is rapidly hydrolyzed in the rumen, we have tremendous amount of recycling back to the rumen back from the blood. Because of that, the animal is able to normalize. We can meet 75% of the microbial requirement for growth and due to recycling achieve maximal protein synthesis.

Dry-processed corn and slow-release urea

When we feed diets with cracked or dry processed corn, there are multiple meta-analyses that show that those diets do better with intact protein than with urea. Urea is actually advantageous with steam flaked corn diets. Because dry processed grain tends to respond more favorably to natural protein, then maybe the slow-release urea could be a substitute for natural protein. Unfortunately, that hasn't been shown to work, either.

Urea's buffering capacity

When we look at animal performance, it has been shown that feeding urea in excess of the requirement for microbial protein synthesis shows a growth performance response even though we don't see the basis for that in the metabolism studies. So, what is happening? This has to do with the buffering capacity of urea. Urea is a carbonyl amide, so every molecule of urea has two molecules of ammonia. When the ammonia are released during hydrolysis, they quickly grab onto a proton to become ionized. When they do that they are pulling hydrogen out of the rumen. This becomes critical since the pH in the rumen reaches it's lowest point 1-2 hours after an animal has a feeding bout. This critical time period coincides with the rapid release of the ammonia from the urea to alkalize the rumen. Saliva is a buffer as well, which is why we like a little roughage in the diet, so the animal slows down and masticates and triggers that initial buffering from the saliva.

Cost of urea

Urea is probably the most inexpensive buffer you can add to the diet. We typically add about 1.5-1.6% urea to our diets, which is in excess of the requirement for microbial growth.



CAREER CALL WITH TARA FELIX



Where you're from and what do you do?

I currently reside in State College PA which is smack dab in the middle of Pennsylvania. I grew up in Venango County, Pennsylvania in the northwest corner of Pennsylvania in a tiny town of about 5000 people. I had the opportunity to come back to Pennsylvania about five years ago, where I took the position as the Penn State Extension beef specialist.

How did you end up working in agriculture? How did you decide to work in agriculture? And maybe more specifically, how do you end up new working with cattle?

I began my career in agriculture at a very young age where I grew up in Venango County. My dad was a nurse and my mom was the farmer. My mom taught me from the time I could walk how to milk goats, how to how to raise chickens, how to, how to breed rabbits. That was our farm and I always enjoyed animals as a kid. I always enjoy working on the farm with my mom. Being from a very small, very rural area I thought if you wanted to work with animals, you had to be a veterinarian. From the time I was knee high to a grasshopper, I told everybody I was going to be a veterinarian. I was going to go to school and study biology so that I could go to vet school. Between my junior and senior year of high school, Pennsylvania had a program at that time funded by the Governor of our state now called the Agricultural School of Excellence. It was the Pennsylvania Governor School for Agriculture. I went through the program and that program changed my whole outlook on school and what I could do with a degree in agriculture. That program permitted me to come to Penn State for five weeks out of the summer between my junior and senior year of high school, take college classes, work with researchers on campus, and really dig into what it meant to be an animal scientist and not just a veterinarian. This was important for me. I was a first-generation college kid. My folks weren't interested in agriculture other than what it meant to produce food for five kids back on the farm and didn't know that a program specific to animal science existed, so that's how I really got started. And then I decided to come to Penn State as a result of that program. I decided to get my bachelor's degree from Penn State, but I still didn't know exactly what I was going to do. I still didn't know how far I could go in this world of being an animal scientist. I started as a pre-vet major, then I took beef production with Doctor Erskine Cash. That was my sophomore year of college and I knew then that I only wanted to work with beef cattle. I went in and I told my pre vet advisor, Dr. Lester Griel, I started this path as a veterinarian, but I only want to be a veterinarian for beef cattle and he said there's there's one of those in the country and you're probably not going to be him. Why don't you check out grad school programs? So I did and the rest, as they say, is history. That was some of the best advice that I ever got from Dr. Griel to go on and study nutrition really built my entire career and I owe that to him.



CAREER CALL WITH TARA FELIX



I assume Penn State was only option for you to go to school, right?

I had other options. Actually, much to my father's dismay, I had a four-year scholarship to a small private school to study biology close to home and instead I choose the expensive public school. But, my parents were very supportive. They understood at that point what it meant to me to have a little independence. Penn State allowed me to move a little bit farther away from home, and they understood the change and why I made that choice. And I think it's a testament to a parent's love to say it's okay to not focus so much on the cost and instead focus on what you want your future to be. It's okay to make changes in your life. I was really worried when I went home and told my parents I decided I wasn't going to be a veterinarian. They had supported me for the last 22 years of my life in this singular goal and to go home and tell them instead I was going to go get a PhD in beef cattle nutrition. Nobody even knew what that meant. Nobody understood what that was. But they were okay with that. They were okay with that change and supported me in that endeavor.

One story that you had during your undergrad that you also lived in Russia for a little bit, right?

I showed up in Russia shortly after the new year in January and it was really cold. I spent six months in Moscow. It was one of the greatest experiences of my life. At that time I thought I was going just because it was a convenient international experience and I knew I wanted to travel. At that time, Penn State had a program where if you spent a semester abroad in Russia, you got a minor in international agriculture. Fall semester I took Russian language courses. By the way, you cannot learn Russian in one semester. I am a testament to that. But with what little language I did have I ventured abroad anyway and it was a really eye opening experience. Growing up in Pennsylvania and then going to school in Pennsylvania, my views on the world were somewhat limited and it wasn't until I began to travel and to expand that I started to really understand some of the hardships that other people face that I take for granted. Being a U.S. citizen and living in a fairly prosperous country. Some of the technologies like the ability to flip on a light switch and know that it's going to work that I take for granted. We didn't have a washing machine when we were there. We washed all of our clothes for six months in a bathtub and let me tell you, that'll give you a new appreciation for the conveniences of modern living that we take for granted every day. But as a person, I think it really helped me to grow. We went with a small group of American students. There were eight or nine of us and our liaison, the person who spoke Russian well so that at least we could get started at the grocery store and things. And we were a very different group demographically. We had two ranch kids from Montana. We had a kind of a hipster from Penn State that joined us for the experience of backpacking through Russia and just the whole mix of kids that wanted to see the world. And together we realized what it took to build relationships, to make a community in a place that was unknown to us, and to make friends in a place that was unknown to us. We had a cohort of Russian students that went through courses with us and we really became close friends. They were all female, interestingly enough, and we really became close friends with those girls to the point where we would go to their summer dachas and enjoy time in their homes with their families.



CAREER CALL WITH TARA FELIX



Then you came back to Penn State, graduated and went down to Florida for your master's degree program. How did you make the decision to go to Florida for a Master's degree? And you can also tell us how you decided to go to the PhD after?

This is another great question because it speaks to the idea of not being afraid of change. There were a lot of times in my life when I really didn't know exactly what I was doing or why I was doing it and that sounds strange. That sounds like you should have everything so well planned out and you're a faculty member. You didn't know from day one you were going to be a faculty member? I had no idea. I had no idea I was going to be a faculty member when I began college eons ago. When I applied for my Masters program, actually, I had just taken an AI program. I had to breed old dairy cows and an learn the techniques and I loved it. I thought this is great. I love breeding cows, so I applied for a reproduction program at University of Florida with Dr. Alan Ealy. Dr. Ealy emailed me and he said he was looking for a PhD student and not willing to take on a master student. He passed my CV around to some other colleagues in the department. Dr. Ealy did that and I ended up working with Dr. Lee McDowell who is a nutritionist. When Dr. McDowell called me and said he didn't have a repro program, but he was studying trace minerals. He asked if I was interested at all in trace minerals. I said I don't know if I'm interested in minerals. I've never had a class in minerals. The only introduction that I had in minerals was general nutrition for animals. I had such a good conversation with Dr. McDowell. He thoroughly explained the concept of the program he was trying to do. He was trying to solve an environmental issue that overlapped with an agricultural issue which really has been a side passion of mine. It sounded really neat. He was easy to talk to and I knew he would be a good mentor because of that. Because he was willing to have a long discussion with me to answer all the questions that I had and really describe the project. When I got there to do my Masters degree, I showed up and literally the day I entered the department somebody said "Are you going to Dr. Mcdowell's retirement party?" and I thought "Oh my God, my advisors retiring. What am I going to do? He's going to leave me." I just came all this way to Florida. He never left. He retired but he's still there working and he was a phenomenal mentor. I walked into his office that first day and he handed me the sheep NRC and said I need to formulate 6 rations. I didn't have a clue what I was doing, but I knew how to do math and ultimately I think that's what made nutrition the right decision for me. I knew how to do the math. It was logical to me. I can't memorize hormone pathways. I'm terrible at it. I've tried. To this day I can't memorize hormone pathways. But I know how to do math and I understand the logic of nutrition. Dr. McDowell giving me that start was really the push down the nutrition path. When it came to deciding a PhD I was a little bit more thoughtful about it. By that point in my career I understood the process of grad school a little bit better, which is part of the reason that I try not to be so hard an incoming master students. I was there once. I understand that you don't always have it all figured out at that stage of the game. You don't always have the right words to describe why you want to get a Master's degree. But when I got my PhD, I understood better my passion for the research. I really enjoyed my Master's program. I really enjoyed the laboratory detail the of my Master's program. I spent a lot of time in the lab analyzing every mineral from just about every tissue of the body and that fascinated me.



CAREER CALL WITH TARA FELIX



It was amazing and I knew that research was an avenue that I wanted to continue to pursue because of that. When I started looking for a PhD program, I knew I wanted to work with beef cattle. My program with Dr. McDowell was great, but we used sheep as a model and I didn't want to use sheep as a model anymore. I wanted to actually work with the cattle themselves, and I knew that I wanted to work on the way that nutrition interacts with the physiology of growing animals. It just fascinated me and I enjoyed reading papers about it. As I was reading those papers, two names kept coming up consistently at that time. Dr. Matt Poore, North Carolina, and Dr. Steve Loerch at Ohio State. I contacted both of them to find out more about their programs. Dr. Poore had a very interesting program with growing cattle that was predominantly pasture based. At the time he was looking at supplementations on pasture for growing cattle. And then I contacted Dr. Loerch and Dr. Loerch was doing more on the rumen side in his history. In his publications he had done some rumen metabolism work. He had done a lot of work with transitioning calves into the feedlot, growing cattle. I drove up to Wooster and visited with Dr. Loerch about his program, and I knew it would be a great fit. I knew from the start he would be a phenomenal mentor and when I left that visit he said, "I don't have funding for you. There's no funding for my program right now. But I think we will work well together and I'm going to try and get the funding." And he did. I ended up at Ohio State despite my blue and white blood. I ended up at the Ohio State University for my PhD.

Can you tell me more about your current job?

Well, quite frankly, I have the best job world and I think that should be everybody's goal to be able to say that. Countless writers over time like Mark Twain and others have said it's not work if you love what you're doing and that's really true. Finding something that excites you so that you want to get up and go to work every day is a great thing. I enjoyed my research position at Illinois. But it was no longer exciting me. I was doing similar things every single day. In my position as an extension agent every day is different. I remember about 3-4 months after I took the job in Penn State Extension, I had an opportunity to sit down and have a beer with Dr. Dan Loy, one of my extension idols from Iowa State. I told Dr. Loy that this job is hard. I have this PhD and I've done all this great research and I find extension really challenging. He said "The first year of my career, every phone call I got was a literature review. Every day is going to be different. There will still be times when you have to go back and dig up answers, but that's one of the really fun things." And he wasn't wrong. Now in my role in extension I'm learning new things every single day. Whether it's a weird genetic disorder that somebody calls about or whether it's digging deeper into the nutrition. Coming back from the Midwest, I'm no longer just feeding corn and distillers grains, I'm feeding bakery waste and chocolate chips and cookies and corn chips and everything else. We are the junk food capital of the world in Pennsylvania and we use those byproducts broadly in cattle. At its core, the thing that makes my job really cool is that my extension job is really a service position. My job is to help farmers be successful and to be able to have that impact on somebody else's wellbeing, on their financial success, on the ability of their farm to stay in business, and become a legacy for the next generation, that's the best part.



CAREER CALL WITH TARA FELIX



Is there anything that you face as a as a challenge? Especially now during covid?

Coming from a position where I was so singularly focused on grain feeding, finishing cattle and my feedlot career. I love the feedlot. I have a passion for the feedlot and I do think that is the way we're going to feed the world. But one of the challenges starting out was there are a number of niche producers in Pennsylvania. Folks raising lowline Angus for grass finished beef programs. Selling a lot of freezer beef sold direct into larger cities just because of our proximity. Being open to discussing the challenges on those farms, as much as I enjoyed talking about the challenges in the feedlot, was probably a personal challenge for me. I have to admit that. Just this week I got a call from Illinois about grass finished show cattle and how to grow these grass finished show cattle. It was a very good conversation. We had a conversation about the hierarchy of nutrient use, about nutrients, and providing nutrients in grams per day versus thinking of them as just grass or just alfalfa pellets. Those kinds of conversations can be had regardless of a producer's personal choices and can be really good and fruitfull conversations. In the midst of Covid, one of the most challenging things is that extension is about relationships and relationships are a lot easier in person. It's very hard to read somebody's body language through a phone call. I just went down last week and sorted off a load of cattle with a producer and had to get permission to go in person to do that farm visit. When I talked to this producer for the first time, I gave him the line were supposed to give, our COVID line. Would you be willing to do this meeting virtually with me? He said, "How the heck are you going to pick out cattle virtually well?". That was back in March and I've been back to the farm since then. We've just developed a good relationship, loading out his first load of cattle together we were able to go through. You know he's a first time cattle producer he's got a young kid that's hopefully going to grow up and take over the farm someday. And having that one on one interaction where we could really engage and really talk about frame size and structure in and what those cattle would do hanging on the rail was really fruitful conversation. Those are some of the conversations that I've missed in the midst of the pandemic.

Do you have any comments or advice for people looking for mentors?

Find somebody who's willing to spend time with you. That's a big part. When I was an undergraduate at Penn State, I worked in the lab of Dr. Harold Harpster, who was a phenomenal nutritionist. I spent a lot more one on one time with his lab tech than I spent with Dr. Harpster. But Dr. Harpster would always just pop in the lab just to see how I was doing, even in my personal life, not just about making sure that I had the data that he needed, but just check in with me. He did the same thing when I returned to Penn State, he just stopped by my office to see how I was doing. When I was a Master's student and I would write the first draft of my lit review or the first draft of my paper, Dr. McDowell would sit me down at the conference room table next to him and get out his red pencil and start going line by line through my writing. He would talk to me the entire time he was editing my writing and tell me exactly why he was editing and what he was writing. I really think because of Dr. McDowell, I became a much better writer. Dr. Loerch would always sit down with me and just have a conversation.



CAREER CALL WITH TARA FELIX



He wanted me to be able to converse about beef cattle nutrition and whether we were traveling on an airplane to a conference or whether we were at the feedlot waiting to collect the next rumen sample, he would just sit for hours and talk to me about beef cattle nutrition. And it wasn't that there was always an answer. It wasn't that there was always an article that I needed to be pointing to the proved this theory or not. He genuinely wanted to know what I thought and why I thought it. All of my mentors throughout my career, I credit to my personal life as well, but particularly Dr. Loerch and his wife, Karen. They just made me a part of the family and they did that with all the graduate students. We were invited for Holidays. We were invited for weekends. We were brought into their home and treated like a member of the family. There's so much time that we're working nights and weekends and long hours. But when you remember that somebody truly cares that you're doing that, it doesn't matter that you're working nights and weekends and long hours. I remember that first Christmas as a master student. I was newly married, six months married. It was my first Christmas ever being away from home. Dr. McDowell came in about the week before Christmas, and he said, "Tara, you go home. Get a flight, go home. You have to be back in three days, but go home for Christmas Day." I hadn't anticipated that. I figured I would be feeding lambs on Christmas Day. And the fact that he did that for me really meant a lot. It meant a lot to me that he was willing to give up his Christmas holiday so that I could see my family. I credit their empathy for me as a student to my ability to have empathy for farmers. That's part of the relationship building process. Empathy involves being able to feel with somebody else and that's a difficult thing to do. But I think all of the advisors that I had remembered what it was like the students, remembered what it was like to be young, and as such were able to carry that empathy forward for their students and that meant a great deal.

What is a fun story that happened during your career or grad school?

I was remembering the first rumen samples that I ever took. I had done rumen cannulation, so I'd seen inside the rumen, but I was not fully prepared for the cough. I was feeding cattle very high grain diets. A lot of distillers grains. Frothy bloat was prominent. They probably all would have died if they didn't have rumen cannulas. I opened up that first cannula and it must have tickled. That calf coughed and I was bathed from head to toe. Myself and the lab technician covered from head to toe in rumen digesta. We have the pictures to prove it. It was one of those moments that was just challenging but at the same time you couldn't help but laugh.

What is your favorite food?

A nice, rare Delmonico. You can't go wrong there. And maybe that's a little cliché for the beef gal to answer, but that's truly one of my all-time favorites.



CAREER CALL WITH TARA FELIX



What is this song that usually plays on your radio or your car?

It depends. Depends on the mood. It depends on what I'm doing. If I'm doing cattle collections, it's almost always the Eagles. That just reminds me of my graduate student days. If I'm on a long drive to a meeting, usually the playlist starts with Rachel Platten's Fight Song. Can't go wrong.

What is something that you know today that you would like to know at the start of your career?

I'm a list maker. I make checklists every single day of my life, and I like those lists to be checked off that day. I was getting to the office at 6:00 AM and leaving the office at 8:00 PM like I did as a graduate student. I remember my advisor actually calling me one evening at about 8:00 o'clock at night. I was just leaving the office and he said, "Why are you just leaving the office at 8:00 o'clock at night?" And I said, "Well, I didn't get everything on my list done and I was really stressed out about the fact that I didn't get everything on my list done." And he said, "Tara, the list will be there tomorrow. Go home, kiss your husband. Take care of your baby. Those are the big things in life and it's important to get the big things right." All the little stuff that we worry about when we're first starting out, not having enough money to travel not wanting to leave go somewhere. Don't get trapped there. The money will come eventually. Focus on the experiences, focus on living in the moment. Put the damn phone down, live in the moment and get out there and get some experience.

What is a top tip you would like to share? It could be a book, podcast, movie, etc. that you think people should know about.

I'm a book girl. I love to read. Picking one book is really hard for me. Everybody that wants to be beef cattle nutritionist should read the Nutrient Requirements of Beef Cattle. Actually read it. Don't just look at the tables. Read the book. Every aspiring writer should read a copy of Strunk and White's Elements of Style and keep a copy on their desk. It is hands down one of the best tools in learning how to write well. Kenneth Eng once wrote a book called Started Small and Just Got Lucky. I had the pleasure of meeting Kenneth at a Plains Nutrition conference once and his book encapsulated who he seemed to be. He was just such an easy person to talk to. It's part autobiography, part US cattle feeding history and it was great. Last but not least, I'll say I've been reading a lot about racial injustice this year. I know this is a cattle call. It's not about racial injustice, but it's still impacting our country in such a very real way. And I just finished a fictional piece called Small Great Things by Jodi Picoult and although it was a work of fiction, it was just a really phenomenal insight into the struggles that we as a society are still dealing with on a daily basis. If you want to be a good person, you have to go beyond just beef cattle, beyond just nutrition, and you have to be a part of your society and aware of what's going on in your community. And this is just one of the topics that I think has really been on my mind this year.

How can we follow your work?

Website: extension.psu.edu. All of my work there is published under the Beef Cattle Site



RESEARCH CALL WITH TARA FELIX



After having a really nice career call with Dr. Felix last week, we're going to talk a little bit more about the work that she's doing at Penn State. Right now, she's investigating the use of beef bull semen in dairy cows and producing the crossbred beef dairy steers.

Can you tell us a little bit more how you came up with the idea of this project and what you guys are doing?

We have been working on purebred Holstein as feedlot models for a number of years. We'd spent several years investigating ways to make Holsteins profitable in the feedlot. We began that research around 2016 and we were able to be very profitable at that enterprise as a lot of people nationwide were. But shortly after 2016, the economics were quite variable. There were still opportunities to be successful when we saw more and more of these crossbred beef on dairy calves in the supply chain. As we saw more and more of those it became harder to source loadlots of purebred Holstein. So, in addition to that and the shift we saw in the purebred Holsteins in the feedlot, I began having more water cooler conversations with my dairy colleagues at Penn State, and specifically Dr. Kevin Harvatine, about the trends that they were seeing on the dairy side with the rising use of beef semen. In 2019, together with Dr. Kevin Harvatine, Dr. Chad Dechow, and our Chester County livestock agent Cheryl Fairbairn, we wrote a USDA care grant that was ultimately funded in 2020 to investigate the use of beef semen in dairy cows.

What specifically did you guys want to investigate in this project? What are you guys doing right now?

I think specifically we are interested in determining if there are single traits or multiple traits that we could put into an index that would make sense for the beef on dairy system. A lot of industry folks have done this. HOLSIm has a terminal index, although not publicly available. There is a terminal index to select those Simmental bulls. In August 2020 Angus has published their Angus Holstein Index along with their Angus Jersey Index. But what makes our research project a little bit different is that we're trying to develop these indices with the end product, the progeny, in mind. We want to have actually tested these sires and these traits that we are interested in feedlot animals and right now that's where the data are lacking, both on the research side and industry side. The uptick in the sale of beef semen really only started as recently as 2017 in to 2018. And so, given the generational interval of cattle, we've just started last year beginning to kill those loads of crossbred calves. It's not a disparaging remark on the indices that are available in the industry right now. It's simply reality that we just don't have the data that we need to put the progeny performance to those indices.



RESEARCH CALL WITH TARA FELIX



Are the feedlots making extra money from the crossbred calves or not? Are they performing better? Have you seen any promising results?

It's a really good thing for the dairy side, and again, because of the generational interval, that's where we have the most data right now. The dairy is getting paid handsomely for those calves at the moment. In terms of promising data, so at Penn State we finished the first batch of these calves last year. Now, unfortunately again, because of generational interval, we were dealing with matings that were already in place when we got the grant. But what we did see is that on average those crossbred calves brought about 3 inches more rib eye area to the carcass than then the purebred Holstein. Now, it was a small data set. This is something we would have to investigate further. I do think even in our small data set that one of the greatest challenges that we're facing with the crossbred animals is the lack of uniformity. The way the feeder makes their money when they sell load lots to the packers, they have a nice, uniform lot. And the Holsteins provided that. The purebred Holstein is genetically so similar that we can get very similar load lots of Holstein cattle. We have managed genetics of beef calves such that we can get very similar load lots of native beef calves. But now, when we put those two breeds together, and particularly when we're using Simmental sires, using Charolais sires, using Limousin sires, using Angus sires, using Angus sires from the 1980s, and now we have variability across the board. A quarter of those calves will look really good and maybe look like native beef cattle and a quarter of those calves are going to grade Holstein. We saw that in our project last year. We had several of those calves that we knew were crossbreds and brought Holstein prices because the shape of the rib eye and the length of their carcass. And then we have 50% of those calves that are kind of a black box. In a commodity beef system where we have to produce a product that fits in a box to be shipped globally, we can't handle that type of variability right now. The industry recognizes that. As an industry everyone is working toward the goal of fixing the lack of uniformity that we've kind of bread into the system now.

Packers really appreciate uniformity in the cattle they are getting and that's why the purebred Holsteins are so appealing because they are so uniform. They know exactly what they are getting.

You're absolutely right. There's a lot of variability based on what specific production system that was being selected for. You take the Angus breed, for example. We have really good maternal bulls, the Angus breed is becoming a more terminal breed. If you look at the NCBA audits, you know 60% of our calves coming through packing houses are black hided. Well, they're getting those black hides from the Angus breed predominantly and Simmental. But those bigger terminal sires may not be what desirable. In fact, if you look at the Angus Holstein index, the frame size is a detriment in that index and same in the HOLSIm index because the Holstein already has such a large frame. This variability is something that we need to narrow down not to just a breed, but a sire within a breed specifically. That's exactly what we're attempting to do to the USDA project. We're testing several sires within breeds and tying the performance of the calves not back just to the EPDs, but to the genetics of that sire specifically.



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It's been said that the crossbred Holstein system is not new and has been around for a while coming and going. Do you see the crossbred Holstein system as something that will stay and grow?

This absolutely is not a new topic were. We're talking about it like it's a very novel topic, but if you start digging into the scientific literature around beef on dairy crossbreds, it goes back to the 1980s. In fact, the bulk of the literature was published in the 1980s, so this isn't something necessarily new that we are doing. I think this approach is different. And the approach is different than it was in 2016 when we first just started pulling all the black semen out of the tanks to put into the dairy cows. The industries are coming together now and working in a much more concerted effort to produce a calf that should be beneficial to both systems. And it absolutely has to be. Right now the dairy industry is benefiting quite well and we have to make sure that that benefit remains all the way to the packer otherwise the model will not be sustainable. Now, with the efforts that all three sides of the industry (dairy, beef, and packer) actually gathering information from these sires, gathering data from these calves, I do think that the model will become more sustainable. I do think given the technologies that we have with sexed semen and genetic potential in the dairy herd and evaluating genetic potential in the dairy herd that some crossbreds are likely here to stay if they benefit the commodity beef production system because ultimately that's where they're going to have to shine. If we can figure out the variability, figure out the bulls that are going to make calves that are more profitable than a purebred Holstein in the feedlot, then the system is likely here to stay. Dairies are not going to go backwards in terms of making more heifers. That's not a sustainable model. The heifers are very expensive animal to raise given her production cycle. It takes a long time before we can start making money on that heifer. We've got to come up with a system for the dairy to get rid of these calves that makes sense, but also for these calves to make money for the feeder.

How are producers in Pennsylvania feeding the crossbred Holsteins?

Right now there's a lot of variability in that as well. When we began researching the purebred Holstein feedlot model, there was a lot of variability in that model. Now, almost everybody puts Holsteins through what we call the calf-fed model where we start them heavy on grain early on and finish them heavy on grain. Personally, my hypothesis is that's going to be the best model for the crossbreds. I do think that they shine in production settings similar to Holsteins, remembering that 50% of their genetic potential is Holstein genetics. I do see a number of folks purchasing these calves to use in a more traditional forage type backgrounding system and that's where I think the variability has the potential to come out. When we try to grow these calves on a lower plane of nutrition, I think it's possible that in some cases the Holstein frame can thrive. In other cases, the efficiency on forage of the beef genetics can thrive and we end up introducing more variability into the model than we can really handle.



RESEARCH CALL WITH TARA FELIX



How can we follow your work and know more about this this project?

WEBSITE

<https://extension.psu.edu/tara-l-felix>

ARTICLE

No bull: Crossbreeding Holsteins with Beef

<https://extension.psu.edu/no-bull-crossbreeding-holsteins-with-beef>

VIDEO

To cross or not to cross: a tale of beef x dairy

<https://extension.psu.edu/to-cross-or-not-to-cross-a-tale-of-beef-x-dairy>



FEEDLOT RESEARCH BRIEF



Phase feeding strategies to meet metabolizable amino acid requirements for calf-fed Holstein steers

Introduction

- A single phase feeding program is commonly used in feedlots feeding calf-fed Holstein steers.
- While this single diet meets the theoretical metabolizable amino acid requirements over the entire feeding period, it does not meet the metabolizable amino acid requirements during the initial growth phase.
- Metabolizable amino acid intake during the initial days on feed limits Holstein steer performance.
- The objective of this trial was to evaluate the use of two and three phase feeding programs to meet metabolizable amino acid requirements and their effect on growth performance and carcass characteristics of calf-fed Holstein steers.

Methods

108 Holstein steers (251±17.6 lb) were blocked by weight and sorted into 18 pens (6 steers/pen). 3 feeding programs were fed as treatments (6 pens/treatment):

1. Control diet for entire feeding period
 - Single, urea-based diet formulated to meet average metabolizable amino acid requirements for whole feeding period.
2. Two phase feeding
 - Fed diet formulated to meet average metabolizable amino acid requirements for first 112 days on feed.
 - Fed control diet for remainder of feeding period.
3. Three phase feeding
 - Two diets formulated to meet average metabolizable amino acid requirements for first and second 56 days on feed.
 - Fed control diet for remainder of feeding period.

Results

- No difference between two or three phase feeding programs for performance or carcass characteristics.
- Multi-phase feeding treatments increased ADG (18%), DMI (4%), and observed vs expected dietary NE ratio (16%) during the first 112 days on feed compared to the single phase feeding program.
- Over the entire feeding period multi-phase feeding treatments increased ADG (6%), DMI (3%), feed efficiency (3%), and observed vs expected dietary NE ratio (3%) compared to the single phase feeding program.
- Phase feeding increased hot carcass weight (5%), dressing percentage (1%), fat thickness (25%), and LM area (9%) compared to the single phase feeding program.
 - Differences in fat thickness and LM area were expected to differences in HCW, but the magnitude of the difference was unexpected

Table 1. Composition of experimental diets fed to Holstein steers

	1 to 351 d	1 to 112 d	1 to 56 d	56 to 112 d
	11.5% CP	14% CP	15% CP	13% CP
Ingredient composition, ¹ % (DM) basis				
Steam-flaked corn	74.95	65.85	61.6	68.75
Alfalfa hay	4.00	4.00	4.00	4.00
Sudangrass hay	8.00	8.00	8.00	8.00
Yellow grease	3.50	3.50	3.50	3.50
Molasses cane	6.00	6.00	6.00	6.00
Fish meal ²	0.00	3.50	5.00	2.50
Canola meal	0.00	7.00	10.00	5.00
Urea	1.00	0.40	0.00	0.40
Limestone	1.40	1.15	1.30	1.25
Dicalcium phosphate	0.55	0.00	0.00	0.00
Mg oxide	0.20	0.20	0.20	0.20
Trace mineral salt ³	0.40	0.40	0.40	0.40
Nutrient composition (DM basis) ⁴				
NE, Mcal/kg				
Maintenance	2.24	2.20	2.17	2.22
Gain	1.57	1.53	1.51	1.55
CP, %	11.72	14.41	15.12	13.19
Ca, %	0.81	0.84	1.00	0.81
P, %	0.38	0.44	0.51	0.39

Implications

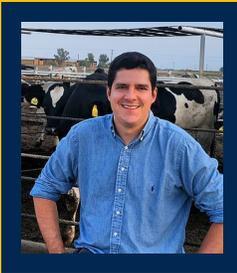
A two phase feeding program that meets average metabolizable amino acid requirements from arrival at the feedyard to 616 lb and from 616 lb to slaughter can improve performance of calf-fed Holstein steers compared to a single phase feeding program

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.

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