VOL. 2 ISSUE 6 · JULY 2022

CATTLECAL NEWSLETTER

ANNOUNCEMENTS

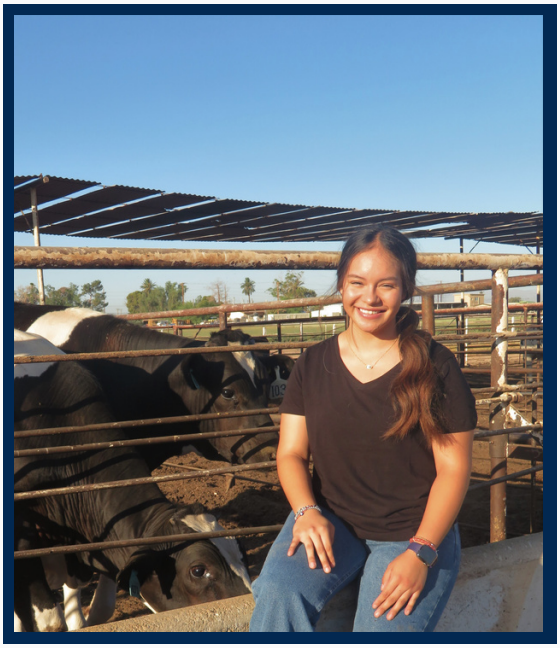
Welcome to the CattleCal newsletter for July 2022! In this issue we have exciting information on methods of including fat in a feedlot diet and concerns regarding removing fat from the diet, the career and research of Jeff Clark, sales associate for C-Lock Inc., and a look at a review paper on fat in the feedlot diet. 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.

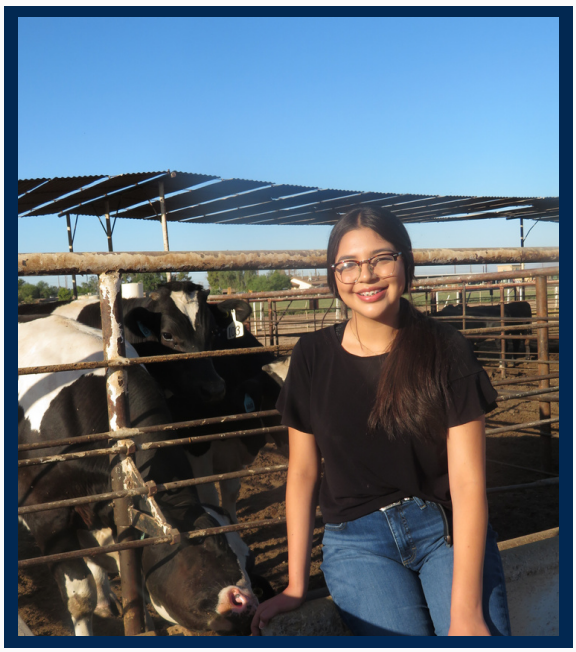
This issue:

WELCOME SUMMER 2022 INTERNS

This June we welcomed three recent high school graduates to work with us and learn more about feedlot production and livestock research. We look forward to helping these future animal scientists develop their skills and knowledge. Learn more about each intern in their bios below.

My name is Yolanda C. Tabarez and I recently graduated from Southwest high school. Within the various pathways offered there I studied plant science, animal science, and veterinary science which led me to my decision to pursue a career in agriculture. I was also member of El Centro FFA in which I raised market lambs for my supervised agricultural experience projects. My plans are to complete my first year of college education at Imperial Valley College and transfer out to UC Davis or Cal Poly SLO so that I can study animal science. My end goal after completing my undergraduate and graduate education is to ultimately become an animal nutritionist or a large animal veterinarian.





My name is Stephanie Martinez. I recently graduated from Imperial High School. Throughout my four years in high school, I was a part of the Imperial FFA. The FFA organization has had a great impact on my life, which has led me to purse a career in agriculture. Within my time as an FFA member I raised market lambs for the county fair, was a farm hand, did several research reports, and grew multiple gardens. This fall, I will be attending Imperial Valley College to complete an associate degree for transfer in agriculture business. Following that, I hope to transfer to UC Davis to complete a bachelor's degree in agriculture business. As an undergraduate student, I hope to gain as much experience through internships and be actively involved in clubs that are closely related to my major. After I have completed my schooling, I plan on returning to the Imperial Valley to become a farm manager for a local business.

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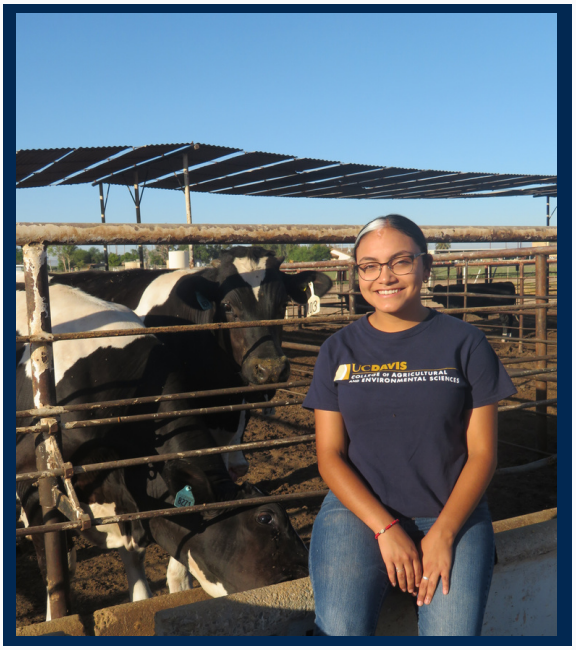
WELCOME SUMMER 2022 INTERNS

My name is Ariana G. Perez, and I recently graduated from Brawley Union High School. Although I have never been involved in organizations like FFA or 4H, I have quite an extensive background in raising animals because I have been lucky enough to spend my whole life on a ranch right outside of Brawley. For almost my whole life I have either taken care of goats, lambs, poultry, pigs, or rabbits. This fall I will be attending The University of California, Davis as an Animal Science major. My hopes are to graduate from UCD with my DVM by the year 2030. I have always been passionate about animals, and I really do have my father to thank for that. Thanks to my upbringing I have always been the one to take in any sick animals I can and nurse it back to health. My hopes are to specialize in livestock during my time at veterinary school, and eventually return to the valley and provide my services to different cattle lots here locally.



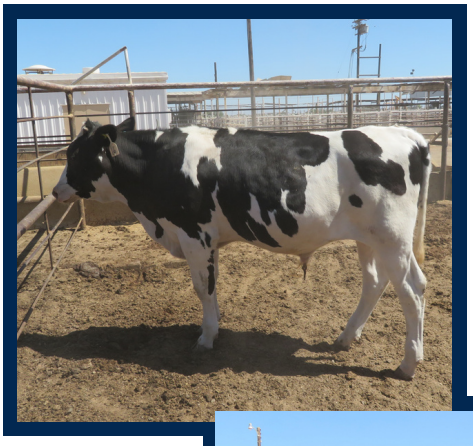
THIS MONTH IN RESEARCH

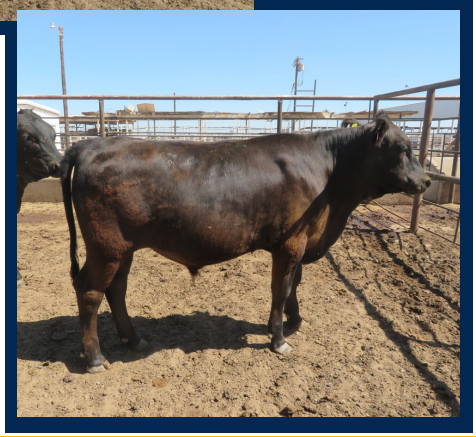
In June we continued our two projects. For June, average temperature was 87.8° F (10° F greater than May), average maximum temperature was 103.6° F (8° F greater than May), and average minimum temperature was 69.9° F (11° F greater than May).

DAYS 112-140 PERFORMANCE SUMMARY

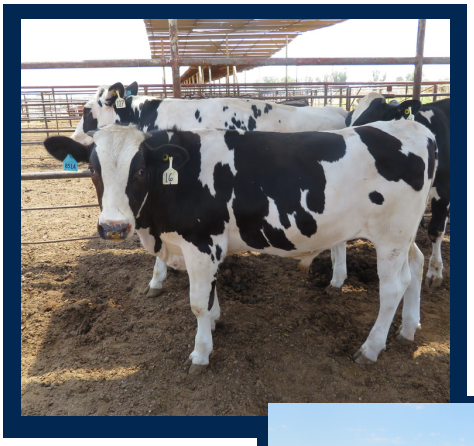
	Holstein	Crossbred
Body weight (d 112)	654 lbs	673 lbs
Body weight (d 140)	782 lbs	799 lbs
ADG	4.59 lbs/d	4.52 lbs/d
DMI	16.7 lbs/d	15.8 lbs/d
F:G	3.63	3.50

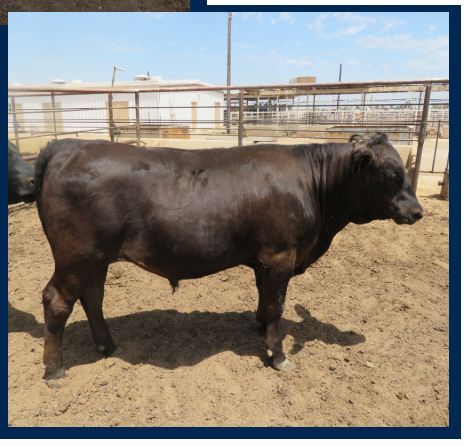
May 2022





June 2022





CATTLECAL PODCAST JULY EPISODES

Quiz Zinn - CCP#061

In this episode, we asked Dr. Richard Zinn about methods for mixing fat into the diet and issues related to removing fate from a feedlot diet.

Career Call - CCP#062

This week Brooke Latack and Pedro Carvalho called Jeff Clark , sales associate for C-Lock Inc. to talk about his journey Cal Poly (SLO) to managing livestock to sales positions outside the ag industry to a position in sales related to livestock sustainability. Listen as Jeff talks us through his incredible experiences that got him to where he is now.

Research Call - CCP#063

This week Brooke Latack and Pedro Carvalho speak to Jeff Clark about the important research and data being generated by products from C-Lock Inc. and where Jeff sees sustainability going for the agriculture industry.

Feedlot Research Call - CCP#064

This week, Pedro Carvalho and Brooke Latack discuss research looking at a review of fat supplementation in feedlot diets.

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 methods should be used when mixing fat into the diet? Also, what are some concerns when removing fat from a feedlot diet?

Fat inclusion methods

One of the benefits of fat is the control of dustiness. This is why it's not unusual for feedlots to add fats to the forage components before it goes into the grinder. Usually, they add about 1.5-2% fat into the hay as it's being ground. It's a great advantage since it removes almost all of the dust. In the past it was believed that if you added fat to the forage it would greatly reduce fiber digestion, however, we conducted several studies years ago that showed that wasn't the case. Even coating the forage with fat made no difference in terms of fiber digestion. In conventional feedlot diets, it should be understood that fiber digestion is low to start with, but fat doesn't make it worse. Another consideration with the mixing of fat is coating the concentrate portion of the diet. Again, a number of studies have been conducted to evaluate this. What we have learned is that it does not have any effect on the extent of fermentation and total tract digestion. It may reduce the rate of fermentation, especially the initial rate, which may be a beneficial effect of adding it directly. Mostly, the fat is added to the concentrate portion of the diet mix and the forage component is added midway through the mixing. It is the preferred way of adding fat to the diet. By doing this it limits the sequestering of fat in the forage component especially if the level of fat supplementation is low. Those are just some considerations of how liquid fat can be added to the diet. If we're feeding a sequestered fat, like in some other countries that simply don't have access to fat handling capabilities but want to feed fat, it wouldn't matter.It would just be added as a component of the concentrate diet.

Consequences of removing fat from the diet

It is important we understand that as a general rule the addition of supplemental fat to a feedlot diet was almost unheard of thirty years ago with the exception's being California and Arizona. It just wasn't common practice. Some of the work that was done at the UC Desert Research and Extension Center was instrumental in demonstrating the many benefits of adding fat to diet formulations. This then grew until pretty much all major feedlot operations began adding fat into the diets. It became so popular that it became like the sacred cow.

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They were afraid to remove it from the diet. This has been an issue. A lot of people are concerned about taking fat out. In terms of caloric basis, fat has about three times the value of corn, so it's a method of increasing the energy density of the diet without increasing the digestive risk. Adding 3% fat would be like adding 9% more corn to the diet. It has that aspect of increasing energy density without increasing potential digestive dysfunctions. A lot of feedlot nutritionists will increase the fat added to a diet during the summertime so that energy intake levels don't drop so much while also maintaining growth performance. Another thing that we often forget is that over the last 50 years or so there has been a number of studies that have evaluated the comparative feeding value of fat and in these studies, 75% showed an increase in daily gain. The average daily gain was a little over 5% so removing fat from the diet may have a predictable drop in average daily gain and a pretty significant one. This should be a concern because when we look at all of the studies we see a pretty high net energy value but actually, there are also some improvements in gain efficiency is due to the increase in average daily gain. In 100% of the studies where fat was supplemented with less than 7% of total lipid intake, in those instances, gain efficiency was improved. Those are some concerns a feedlot would definitely pick up on since they would see a gain efficiency. Something to remember is that nutritionists usually want to try to keep the diet isocaloric. In other words, they might change the diet formulation but they like to keep the same energy density because if they don't then there will be changes in feed intake and the feedlot is going to start wondering why there are feed conversion changes. Unless there is an increase in grain after fat is removed, then there will be drastic feed conversion changes.

The last thing I would say that most people realize is that if you're looking at it from an environmental perspective, the fat supplementation predictably reduces methane energy loss. Although in feedlot cattle that is less of an issue than it would be in range animals, it reduces methane by 20-25% on average. This raises another concern and is not nearly as big as the economic considerations but it's still something that would be considered if we're going to drop fat out of the formulation. So those are just some issues to consider.

CAREER CALL WITH JEFF CLARK

This week we speak Jeff Clark who works in business development and sales for C-Lock Inc. and his journey from learning to rope to working in the realm of livestock sustainability.

Where are you from, and what do you do?
I'm from California, Northern California specifically. I grew up in the east Bay Area. Pleasanton, Sunil, Livermore, kind of that area, and currently I am in business development and sales for C-Lock based out of Rapid City, South Dakota.

Can you tell us how and why you decided to work in agriculture, and more specifically with cattle?
My grandma was actually from Ogallala, Nebraska (Sand Hills area) and she took me on a trip up that way roughly around the age of 10, and I remember when we went out there we vacationed out in Lake Mcconaughy, which if you aren't familiar with, it's a very large lake with very sandy beaches. We took a drive through the hills and ended up in Arthur, Nebraska and I just couldn't believe the grass production and the cattle. This was at the age of 10, no experience, no one in my family was in the livestock or ag industry. I just looked around and this was what I wanted to do. I decided that day, "you're going to learn to rope, you're going to do it all." I just fell in love with it, so when I returned home to the East Bay, I got involved with 4H, because that was really the only thing available to me. I made some friends with property, which were nice enough to allow me to start to ride and learn to rope at their place. I just kind of decided that it was what I wanted to do, and then I worked every step of the way to gain the skills necessary. When I turned 18, honestly, I didn't have good enough grades to get into Cal Poly, so I ended up moving down with some family on the Central Coast and going to Cuesta College. I was a 6 year "4 year" degree student. I did 3 years at Cuesta College, 3 years at Cal Poly. During that time when I moved to San Luis Obispo, I was lucky enough to land a position at a local feed store. Anyone down there, who has gone to school down there, knows about Farm Supply. So, it's kind of your local store where all farmers and ranchers will go to get various supplies. I just started working in the back, where I met some good people with some local ranches, and just started helping them with their property. By the time I was about 19, I owned some cattle and was running those on one of those places, kind of in payment for the help and labor of running the day to day operation. I even kept a horse out there, and just continued to develop those skills. Moving on, I made some good friends who introduced me to some folks that at the time ran the Santa Margarita Ranch. I will mention Aaron Lazinoff is the current Beef Operations Manager at Cal Poly. So, I had met Aaron through some mutual friends and he made a move to Cal Poly, right when I made a move from Cuesta to Cal Poly. So, it was a really good transition for me knowing someone on the beef side at Cal Poly. He was new, I was new, and I was lucky enough to get hired as a beef department employee at that tim. I actually moved into some housing that they had at the Beef Cattle Evaluation Center.

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CAREER CALL WITH JEFF CLARK

For those of you that have been out there, there's a little barn out by the manufactured home they have out there, and well where the office of Zach McFarland now is, in Aaron's office is where I lived. So, it was pretty rough moving in there, but it was well worth it. I will tell you, at the time my colleague was still at Cal Poly as well, and what I learned from Aaron in my time there, just shaped the rest of my career. I went in there pretty green. I had owned some cattle and done some stuff, but like I said, I didn't grow up in this industry. I just had to learn it and pursue it. The opportunities for managing the Escuela Ranch Project, managing the bull test at Cal Poly, led to other opportunities and other networking opportunities that have continued to bring me down this road.

Can you tell us how and why you decided to seek those opportunities on your own, and do you feel you had to develop that skill or do you think you've just naturally been an opportunity seeker?

Quite frankly I think that's why I ended up in sales. I enjoy talking to people, I enjoy helping people, but I think the reason why I enjoy my job and why I have done well in this role is just because I work hard too. That brings it back to when I was young, I would work for free. A lot. I would sign up to brand calves, I would build fences, I would process cattle, and all of it for free on my own dime, because I needed to build those tools. I knew that there were going to be some points in the process that something was going to pop up that I didn't know, and I may be a hindrance for that short window of time, and to only pursue opportunities where I was being paid as an asset to the operation didn't make sense early on. I can't tell you how much I have done for free just to get to the point where now people call me to consult. It's just that you have to be able to work, and you have to be able to look at those opportunities and make them. I didn't have anyone to guide me towards this, I just knew what I wanted and I knew that if I wanted to get there I needed to work. I always felt that, before you get a promotion you have to be doing the job that you really want the promotion for. You can't just do your job mediocre and expect to get the bump, so I've always worked or at least tried to work at a higher level, because I want to get to that next level.

Can you tell us more about your job, what you do on a daily basis, and some things you've been working on?

Let me give you a little background of some of the moves I've made to land in this particular area. So, getting into the animal science department at Cal Poly was not easy. It was highly competitive. I was a state entered student, I also worked over full time hours the entire time I was going to school. So, I actually had to transfer from Cuesta into Cal Poly under a different major, which was an Ag Engineering major. Luckily for me with my contact already in place in the beef department and acquiring that job, I worked with Mike Hall who helped me make that transfer to Animal Science based upon my work and labor at the beef department. Again, I may not have been the best student, but I think that Mike saw that I was going to work in the industry and he helped me along in that aspect of transferring majors. In doing that and managing the bull test, we actually had Five Rivers Cattle Feeding out for a presentation. At that presentation they offered me an internship, which I accepted and went in and interned at their Yuma, Colorado feed yard for a summer. At the end of that internship, which was the year before I finished school, they then offered me a paid position at the Yuma yard which I accepted. Upon graduation, my wife and I got married during the last quarter at Cal Poly, and we decided to go ahead and move out that way.

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CAREER CALL WITH JEFF CLARK

I worked for Five Rivers for about a year in the feed department there at the Yuma, Colorado feed yard, and that experience didn't pay a lot at all, but we had a 100,000 head on feed working with a high level nutritionist, managing feed intake. At the time I was responsible for rolling out Zilmax which were still available on the large scale feed level, which was a fun project for me to be part of, and learning that process and learning how to implement that on such a scale. I gained a lot of experience there, but then eventually we found out we were having our son. Being young and in the middle of nowhere Colorado, we decided we ought to get back near family. We decided to move back home to the Central Coast, where I took the job managing a small cattle and alfalfa growing operation for an absentee owner that lived down in Newport Beach. He was out in the Poso area, east of Santa Margarita. I was out there running that operation and I was also in full time sales for Farm Supply. They actually offered me a position out of school, where I became a dealer designated agent, where I facilitated paperwork for pesticides and insecticides. This wide swap of different experiences there, being mixed with the cattle side of things. From that point we ended up finding out we were having our daughter. We had some major complications with my daughter, where my wife had to go into the hospital for the last three months of the pregnancy. At that time I had a one year old, was running the ranch, and was definitely a trying time but we luckily made it through all of that, but with that being said, it was one more mouth to feed. I needed to make a move in order to allow my wife to stay home and focus on that part of our family. At that point I was approached with a few options, both of which in the Central Valley on seed stock operations. I decided to accept a position with Sierra Ranches out of Modesto as their cattle manager. We moved up there and I managed their commercial cow herd. At the time there were about 500 commercial cows, and about half were part of the Purebred program. When I took that on we had a handful of high quality donors and maybe about 100 purebred cows at the time, and my job at the time was to focus on the donors and getting them ready to flush, tagging calves, branding calves, and just managing day to day. I did have one employee helping me it was a lot that we were running, but that's how you learn. You get thrown into the fire and I just had to develop programs that would work so that we would be able to move forward in a way that we would be successful, and be able to manage with the employees and assets we had in place already.

How was it that you ended up in South Dakota?

There are a couple more stops that explain this, but in that time at Sierra Ranches my family decided that we missed the Central Coast and missed our family, and along those lines it was hard having two young children, one with some special needs, and working that lifestyle. I changed positions and accepted a job as an outside territory manager for a building product distributor. We sold fencing. That's where my background came in because all of the ag sales came easy to me, but I had to learn everything from selling shingles, to nails, to rebar. Why I mention this is because managing the money and the volume that flowed through that distribution warehouse was a great experience for me. It also allowed me to create a track record, and even though it wasn't in the industry that I wanted to be in, it allowed me to build relationships and increase sales, which was all recorded on their performance analytics that I can then bring with me and then say, "I increased this territory by 30% in a year," which really helped for my own confidence and reassurance that it was what I wanted to get into sales again.

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CAREER CALL WITH JEFF CLARK

The harder you work, the more money you typically make in a commission-based environment. Another thing was managing that and learning from a nationwide company about how to set up those performance analytics to make sure you're moving in the right direction. I did that for about a year and a half, and then our family decided to move up to Dixon, Rio Vista area, in Northern California, where I accepted the breeding herd division manager position with R Emigh Livestock. They are a 5th generation livestock company, and I say livestock because they're not just purely cattle. We ran quite a few sheep based out of Rio Vista, California. I was there the last 5 years. In that role in Rio Vista I was responsible mainly for managing our cow and ewe locks. The cow herd was composed of 1,500 mother cows and the ewe flock was made up of about 6,000 Western White-face Fine Wool Sheep. Additionally, my role rolled over to aiding in a lot of our program implementation, vaccine programs, protocols for our feeder cattle, cattle and feeder lamb operation. We ran about 8,000 feeder calves and about 20,000 lambs on pasture in Dixon. We also had a sheep feed yard located about 5 miles from the Superior plant in Dixon. It has a capacity of about 20,000 head and we turned that over about 4 times a year, so that makes about another 80,000 lambs through there. I was kind of all over the place, but my main focus was the breeding herd. In that, I worked with some of the best people, I feel, in the industry. The owner of the company, at the time I was hired on, was 89 at the time and his grandson, Ryan Mahoney, was about 33 or so. I was about 30. We were close to the same age. The CFO was also already a good friend of mine (around our age), so our corporate management team was young, passionate, and we all wanted to move things forward. When I started there we didn't have an ear tag in a cow. There was literally no way to identify anything. We had a really good set of cows. 500 of those 1,500 cows were Purebred Angus that we raised strictly for producing our replacement females that fed to the 1,000 head herd of terminal animals, which were actually enrolled in the American Kobe Beef Program, with Agri Beef. We would lease Wagyu bulls from Agri Beef, turn them out on our cows and all those calves as a result were precontracted back to Agri Beef. I had to maintain this purebred herd of Angus cows, as well as the commercial herd, while developing the ewe flock at the same time. Although it was quite a bit, I had a lot of good help and the leadership from Ryan Mahoney was just tremendous. During that time we also implemented EID tags, and technology across both the ewe flock and the cattle. We then used that information to just fine tune our calving window, fine tune our fertility. At preg-check we would call by month, so on an annual basis I could follow how many cows did we have open up in that first day window, how many the second, how many the third. We would typically calve for 90 days, but it was just nice to watch as we moved the needle closer to that 30 to 60 day window. We would have never been able to do that without the tags and the technology. The other thing it was great for, was when we grafted a calf to a cow that maybe lost her calf, well at the end of the season she comes in and we think she raised a calf, now I have a wand and we run her through at preg-check, it'll alert me that she killed her calf so she needs to go down the road. Using that technology to be able to do that was really helpful. I tried to work with Emigh livestock to move out of state the last 3 years because I was invested in that program and that company, and just loved the ownership. With having a few young children and the current climate out west we made the decision to move out this direction for our family.

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CAREER CALL WITH JEFF CLARK

How was it that you were able to take your knowledge and be able to apply it to what it was you were doing with cattle?

When running such a large scale operation like this, you have to move at such a fast pace, so we really needed to figure out how we were going to manage this. What other traits do we need to focus on, and is it going to be feasible. I believe that is the barrier with a lot of commercial operations. They are just working so hard that when are they going to have the time to figure this out. We did invest in expensive technology and it made my job a lot easier. Our replacement heifer program even turned into such a tremendous program where we turned our focus towards sustainability and efficiency. I began to only buy feed intake tested bulls that went into that replacement female program, but at the same time we're cattlemen, so if those cattle had poor feed they had to go down the road, and when you get into that, efficiency is really a terminal trait to a degree. When you look at RFI as a tool, you need to be careful and make sure you are balancing that with proper back fat to maintain fertility, foot quality (in angus breed), and other traits. So having my database and utilizing the gene max advantage for their commercial cow indexes, I was able to take my group of heifers every year and realized sires on all of them and have that on my database. I took weaning weight, I took breeding weights, I took pelvic measurements, and we were able to compare that to the genomic credentials I was provided through that g-max advantage test and scrolled through for my top performers. We would actually breed those cattle two weeks to even a month prior to our main cow herd so they would calve a bit early, and we'd be able to concentrate on calving out those heifers who may or may not have some issues. Then we'd be able to move onto the cow herd. When we bred those cows, we would then ultrasound those cattle at 30 days gestation from the AI breeding. At that point in time we would be able to identify all those cows that were bred up early to the AI. Then I would go back to the system and put alerts for my wand on all those heifers that had good performance data, good genetic data, as well as were sired from the top end bulls. We would then put the cattle back through the squeeze chute and we'd scan them and check if they were bred, and based on what the computer would tell me about the bulls available, I could then send them to the right direction. We got to the point where we got to the top fertility, top feed efficiency, and our top animals were all in those top groups. In the years I was there, there was a lot of genetic progress made in that area but we never could've done it had we not first implemented that tracking system.

Can you tell me about your current job?

I started to look and see what was available and I began to run into C-Lock at the NCBA show down in Phoenix, when it was there about 6 years ago. I knew about the technology and actually thought about bringing it on for monitoring some of our own heifers for feed efficiency. The feed intake/efficiency was already something I was passionate about. They had this position open up out here in Western South Dakota for sales and I just thought to myself that I already knew how to use this stuff and how to do it, so I thought I'd look into it and have a conversation with them. I reached out and it seemed like something I would enjoy doing. I love working with people, and more importantly, I love solving problems and first and foremost, I am a producer. We would run a few cows, a few sheep, not many at all, but that's my passion and so we started to look at where the industry is going and where possible regulations are coming.

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CAREER CALL WITH JEFF CLARK

I would say that the green feed product that C-Lock Sells is what really made me decide to take that jump. I wanted to be involved with implementing the methane and carbon dioxide emission monitoring on ranch, because I wanted it to be done the right way. I wanted to be able to help guide that in the right direction, where it becomes an opportunity for producers, and not a liability. So that is why I decided to take this position and move out this way. In my current position, in sales and business development, I'm responsible for working with everybody from the USDA to private companies that are facilitating feed additive research to universities and extension research folks, etc. For me it was everyday something new, and everyday we're improving the industry and I think that's why I have enjoyed it so far.

What are the challenges that you feel you faced when starting your career, and how did you overcome that? What advice do you have for people looking into careers in sales?

I would always say that if you want something bad enough, you'll figure out a way to do it. You'll utilize all your resources available to do that. I really don't have any formal sales training, but what I do have is my experience as a customer. In running some of these operations I have been the one requesting quotes, I've been the one implementing the technology, so I know some of the hurdles that my customers will see in starting a new project or even simply getting a project funded. I think that to be successful in this role it is mainly tied to just a personal belief that, if you don't ever fail you're not trying. When I started I couldn't rope, I couldn't do anything. You go out there and look like a fool for a while, but I was okay with that because I was building those skills and I think you can't be afraid to fail. I would also say that I think a lot of folks want to go straight to the top. They want to skip all the middle part and get to the now, and that's not how it works. That's not how you get there and that's not how you maintain that long term. You need to look at every opportunity as building blocks and really work hard and make sure you are maintaining your reputation and those relationships, because in the livestock business it's all about relationships. We need to maintain those relationships, and they essentially lead to more success. You also need to know your value. If you are in a work environment that isn't healthy, or you don't feel that you are being valued, you need to not be afraid to make a move. You do need to be able to see an opportunity and take it, and not worry about going back to failing, but don't find your value in what other people think about you.

What is something that you are now dealing with today that is really surprising, and that you did not expect to encounter when finishing your degree?

I would say that in my position now, being the only one on our team without a masters or a PhD, I don't view my education as a barrier in my point in life and career. There are folks with PhDs that are calling me for advice with projects and such, so I guess I just didn't know at the time that it was possible to get in this role just through experience and work. At this point in my life I have a lot of people asking me if I will get my masters or PhD but I didn't realize how much I would enjoy working in sales/commission work, where the harder you work, the more you are rewarded. I always thought I would have a salary job and that would be that, but as I have progressed I am now realizing that performance based reward. I thought I would be working ranch making a lot less money, but riding horses every day, and it didn't turn out that way.

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CAREER CALL WITH JEFF CLARK

What is your favorite food?
Mexican food, and I miss it so much being in South Dakota. The Mexican food in California is a little bit better than we have out here.

What is your favorite genre of music?
When I started roping I got into the old California style roping, and I had big tapaderos on my saddle. So, I listen to a lot of old cowboy type of music. Dave Stamey for example, he's a great one. And some more new aged stuff. I'm a fan of Cody Jinks, Cody Johnson, but believe it or not I don't listen to enough podcasts when I'm driving.

What is something that you know today that you wish you knew back then?
I wish I would have known that I would want the higher degrees. I tell you right now that I don't want to go back and do that, but had I known I would need and want that in my current role I wish I would've done it back then. It would have been a lot easier without kids, without a career, without a mortgage payment, you know what I mean. I would say, if you're thinking you may ever want those things down the road, do it now! Do it when you're young. Don't stop. Continue down that path, and also don't feel that if you don't get where you're wanting to go in there first 5 years out of school, that you failed or you wont make it. Life is a lot longer in the grand scheme of things.

What do you see as the future in the beef industry?
I'm fortunate enough to get to travel around the country a bit, and I get to see people overseas, all around the world and it's really neat to be able to talk to folks all over the place. We all come back to this common idea, that the next thing we need to do is just continuous improvement as we have been doing, but it's going to be in different areas. Over the years we have been very focused on low input cost, high output performance, and those things are going to maintain the top spot, but there's other opportunities that are going to be put into play. Specifically on the sustainability front. In a lot of big businesses nowadays, there is a sustainability budget, where they have money to spend in these areas, and we as livestock producers need to reduce some of our hesitation and adopt some of these technologies to monitor on farms. That way that next opportunity is going to be an asset, and values being added to the farm, in versus to liabilities. We may no longer be utilizing a lot of the equation based immersion ratings, and we're actually going to be able to start utilizing actual baseline data from collected emissions from real world management practices.

What is your CattleCal top tip?
I really don't have anything to add on that. I would say if you are heavily involved in the beef side of the industry and you really want to get a handle on where the seat stock and commercial operations are at, as far as their mind set and what they're working towards, separate from what academia thinks they should be doing, I would recommend listening to the Angus Underground Podcast. Good friend of mine, Joe Fisher, is part of that podcast and I bought all my bulls from him when I was at Emigh Livestock. I literally went to him and enjoyed his cow herd and basically asked him to start feed intake testing and he agreed and he set up that kind of relationship.

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CAREER CALL WITH JEFF CLARK

The reason I mention that podcast is because Joe is a commercial cattleman at heart. He has a good handle on what his customers need and want, and his family are commercial cattle ranchers, so listening to that podcast you not only get a good idea of where seed stock producers are at, what their looking for, but you also can gather a lot of good information of what their customers are asking for. What are folks in the cattle industry demanding on the genetic side?

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RESEARCH CALL WITH JEFF CLARK

This week we talk to Jeff Clark again to discuss the technolgies offered by C-Lock Inc. and how they are being used to address sustainability in the animal agriculture industry.

Could you give us a little bit of background about C-Lock?
C-Lock is a family owned and operated company. We're based out of Rapid City, South Dakota. The company was founded in 2005 by Dr. Patrick Zimmerman. Dr. Zimmerman has an extensive background in range management and atmospheric science. He is really an expert in both the range space, as well as flexes, air flow, and kind of anything to do with the atmosphere. He coupled these together for a project that he had years ago before the invention of our flagship product Green Feed, where he was monitoring methane emissions from termite mounds in Africa. He had to invent a device to do that and after he completed that project he thought to himself, "How can I adapt this machine to work for large ruminants?". So that's what led him down the road to creating his first Green Feed in his garage. Today, we not only offer Green Feed, but we offer our Smart Feed line of feed efficiency monitoring equipment, scales, precision feeding technology for both pasture and yard systems, and we're in over 42 different countries around the world.

What types of research are you seeing that people are doing with the technologies that you guys offer?
We service everyone from commercial and seed stock, to beef and dairy operations who are collecting data mainly targeted towards performance metrics like feed efficiency and average daily gain all the way to research that's being done now, where folks are actually phenotyping emissions in individual animals and looking at heritability and how we can breed these animals to produce more efficient lower emissions producing animals. Apart from that I would say feed additives are a large part of our business. There are people looking for that golden ticket of a product that really doesn't impact performance but does decrease emissions. I'd say those are our largest users at this point, but what I'm most excited about is the current research that's being done for baselining US management practices. To me, coming from the producer side, I've heard for years how much we polluted in this area and no one can tell me what the actual numbers are. When we look at all this actual data on the backside, it's all derived from these equations that are based on assumptions, and now we have this Green Feed product that provides you with actual measurements in a real world environment.

What are some of the challenges you are seeing and what are some potential solutions you see down the road?
We've tried to create products that take a lot of those challenges out. So, just to give you an example, all of our products can work with either hardline power or solar power. You can work with them remotely. All of our products have a built-in computer system, so if you lose your data transfer capability, which is offered via Wi-Fi, you can store up to 2 years of data on the system. We automatically monitor your system for issues with data or power and send automated alerts to give you a quick heads up.

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RESEARCH CALL WITH JEFF CLARK

It takes out some of the issues that folks have seen in the past where they might not find a problem until the end and their research is ruined. We really have tried to put these safety items in place to make sure that the data is good, and you're notified of any issues up front. So, honestly the largest struggle I think folks are finding is funding. This latest Climate Smart Grant opportunity from the USDA has been a great opportunity for a lot of folks to try and get into this type of research. I'd say the cost barrier. Our equipment is valued to the portion it provides, however, it's not cheap. I think if there's more funding available for this type of research, we'd see a lot more being done.

What do you see in the future, related to sustainability and livestock production?

I see genetic progress being a leader in this area. I also see some of these feed additives that have been working for a long time to get the approvals needed to be used on a large scale, they're getting extremely close. Take the 3 NOP joining forces with Elanco as an example of that. 3 NOP is a great customer of ours, and has been for years and so all of these things are coming to a head. We have some folks in Ireland that have been capturing both feed intake and emissions data on cattle for years now and they're looking at the heritability and the breeding opportunities to genetically select for cattle that produce lower emissions. The cool part is that we're seeing this all tie back to the rumen microbiome, so what they're finding is the heritability of emissions in particular methane is between 0.3 and 0.4, which is similar to feed intake. You can make some genetic progress there. Some of the more interesting side of this to me is that we're getting into some more studies that are actually looking at the rumen microbiome and what those lower emitting animals have as far as a population of bacteria, versus the higher emitting animals, and if there is a genetic component to that.

What is something in sustainability that we have been missing that we should be looking at?

I think we all need to agree on what sustainability really means. We have the data that shows, obviously cattle in a feed yard or in a dairy situation are just so much more efficient and produce a lot less emissions than a grass base system, but we have a society now that is pushing towards that grass-based system of lower production and higher emissions to a degree as their sustainability golden ticket. Both of these things really need to come together. We do need to look at and compare not just the emissions from these grass-based systems, but also what kind of carbon is sequestered into the ground through that grazing process. But, transversely we need to look at this on the feedlot side, because a tremendous amount of carbon is pulled into the ground when we grow corn, wheat, and some of these other feed ingredients. So, we really need to quantify the whole system instead of looking at the snapshots, and I think we're getting closer to that now, but I think that's really an area where we may find out we're a lot closer to neutral than we may have thought. So that's kind of where my mindset is, and I view our technology as a way to monitor that and a quick producer down the road to maybe capitalize on some of these emerging carbon markets and other opportunities.

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RESEARCH CALL WITH JEFF CLARK

Does C-Lock have any internal opportunities for research that you would like to share?

We actually have facilitated a grant program in the past and actually at the GGAA the founder and owner, Dr.Patrick Zimmerman, announced that we will be providing another grant opportunity specifically looking at implementing Green feed with specifically some new technology or additional data point monitoring systems. That will be coming in the next 6 months or so, and some more information will be out on that but if you're not already signed up for our newsletter, make sure you go to our website and you will be updated as these things progress.

What else, other than methane, should we be looking at?

In addition to methane and carbon dioxide, Green Feed also monitors hydrogen and oxygen. Obviously hydrogen is extremely handy if you are performing a feed additive trial to monitor that shift away from methane, but also that oxygen side really helps us realize metabolic functionality. So those are really important, but we've actually just designed a system to monitor both animal body weights along with water intake, and so we're fine tuning that system but I think the next step is that we need to complete the circle. We tend to hyper focus on an area that is typically greatly affected by other things. Take feed efficiency for example, where you can focus on feed efficiency, but environment, weather, feed type, ration, the weight of the cattle, etc. all of these things can add to that component and we really need to be looking at more of a life cycle assessment. We also need to take into account carbon sequestration and water resources, and everything tied to that. I think just reducing that carbon footprint, while increasing performance is really where we need to be. There isn't one spot that I think is more important than another. I think the biggest hurdle we may have is implementing these practices on a large scale, and that's where we need to focus. Whether it be through genetic progress, or feed additives, how are we going to monitor the improvement and do it on a national and maybe global level that has some sort of certification tied to it to add to the work that we're doing. I think you're going to see some opportunities for consultants and third-party verification programs. I even have some ideas with bringing Green Feed to commercial settings and providing feed yards with averages that way they can possibly bring it all the way to the supermarket, where we have pen loads of cattle that have actually been measured for enteric emissions. Almost like when you buy an airplane ticket and you see the carbon footprint on the ticket, we can do the same with beef packages.

Of all of the countries C-Lock is involved with, is there anything in those places that we are not doing here that is helping those places?

I would say that the United States has been a lot slower to adopt this technology, both on the feed efficiency side and intake monitoring, as well as the methane carbon dioxide intake monitoring. We have customers in Ireland, for example, that do this work for a lot longer periods of time. They're past the point where now they've collected the baselines, and now they're looking at the next steps. The Irish Cattle Breeding Federation for example has done a lot of work looking at heritability, which are things we haven't done here. I would say that I'd probably get an inquiry from Australia once a week in regards to some of our pasture feeding systems, and they're looking at how to feed a methane reducing feed additive on a large scale to commercial cows out on the ranch. Some of these things that we haven't looked at here, but we're getting there, and they've been doing for a while.

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RESEARCH CALL WITH JEFF CLARK

Any last things you'd like to add?

One thing I would like to add as a producer myself I'd like to thank you guys and pretty much everyone out there who is doing work in this area, for looking at it from the perspective of having the producers best interest in mind. We know that you do and you're really working to find solutions that will make the food system more sustainable long term, but also keep family farms and ranches operating with as little impact as possible. I'd like to thank everyone for the work that you're doing and I really do think you're on the right track, and the future needs to hold an opportunity for ranchers to sell credits for what they're already doing to companies that need these offsets. Some things in Ireland that have recently been passed have worried me a little bit and just the foundation of our country relies on free markets, and that's just the way to continue developing this, so I just hope it continues that way.

FEEDLOT RESEARCH BRIEF

A review of feeding fat in feedlot diets

Benefits of fat supplementation

- Improve palatability
- Improve feed efficiency
- Improve reproductive efficiency
- Help alleviate heat stress
- Reduce dust while mixing diets
- Add lubrication to feed mixing equipment
- Reduce particle separation leading to more uniform mixes
- Reduce methane production

Ideal quality parameters of supplemental fat

- Moisture <1.5%
- Impurities <1%
- Unsaponifiables <1%
- Total fatty acids ≥90%. Less indicates dilution with other ingredients
- Free fatty acids – high levels (>15%) indicate improper storage or handling of fat
- Iodine value – more saturated means harder fat; less saturated means softer fat
- Initial peroxide value (rancidity) <5 mEq/kg to be considered not rancid. Should not exceed 10.

Methods of including supplemental fat

Methods may be use to reduce dust at certain steps in the mixing process (e.g. as forage is being chopped). No affect on method and timing of inclusion while mixing the diet on performance of feedlot cattle.

Level of supplementation

- Adaptation period required to supplement fat
- Receiving diets should contain no more than 2% supplemental fat
- Optimal feeding value of fat happens at a total lipid inclusion of 0.096 g/kg BW or 7% of dietary dry matter. Beyond this level, NE decreases linearly as total fat in the diet increases.
- Little evidence shows that the feeding value of supplemental fat is different for Holstein cattle compared to beef breeds in the feedlot.

Supplemental fat feeding value

- Concentrated source of energy and essential fatty acids
- NEm = 6.00 MCal/kg
- NEg = 4.85 MCal =/kg

Factors affecting the feeding value of a fat sources

- Type or source of the fat
- Free fatty acid concentration
- Degree of saturation or titer
- Method and level of supplementation

Table 2
Average chemical composition of commercial feed fats fed to feedlot cattle

Concept	Yellow grease [11,13, 14,37,50]	Bovine tallow [11,15,31, 40,50,67]	Blended animal-vegetable fat [9,39,67]	Soap stocks [7,13,66]	Calcium salts [32,33,39, 41,45,67]
Humidity	0.40	0.12	0.88	1.40	—
Impurities	0.22	0.08	0.56	4.90	—
Unsaponifiable matter	0.71	0.31	3.88	3.46	—
Iodine value	82.06	54.04	67.16	102.60	—
Total FA	92.60	92.48	92.90	85.70	81.30
FFA	13.95	7.80	51.00	54.80	—
FA profile (%)					
C16:0	18.03	25.23	22.30	21.50	49.80
C18:0	10.32	15.73	13.70	6.00	4.03
C18:1	46.88	42.18	35.50	26.50	36.30
C18:2	17.16	5.26	18.70	40.20	7.46
C18:3	1.42	0.47	1.55	3.10	0.30

Cattle performance when supplementing fat

- When % total dietary fat < 8%:
  - Increased ADG 5.3%
  - Increased G:F 7.5%
- When % total dietary fat ≥ 8%:
  - Decreased ADG 3.0%
  - Increased G:F 2.6%
- When total fat intake < 1.5 g/kg BW:
  - Increased ADG 4.5%
  - Increased G:F 7.1%
- When total fat intake ≥ 1.5 g/kg BW:
  - Changed ADG 0%
  - Increased G:F 4.3%

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