## Beef Cattle Reproductive Research with Dr. Rebecca Swanson

## Season 1, Episode 63

[Intro music]

**Kiernan Brandt:**

Welcome to Cattle HQ, a podcast from industry experts and progressive producers discussing cutting edge info about the cow calf sector to keep cattlemen and women in the know and positively affect their bottom line.

**Robin Salverson:**

Welcome to Cattle HQ, brought to you by South Dakota State University Extension. I am Robin Salverson, Cow/Calf Field Specialist, living the life in Lemmon, South Dakota. I am joined by Dr. Swanson, the assistant professor with South Dakota State University. Welcome, Dr. Swanson, to this episode and also welcome to South Dakota State University.

**Dr. Swanson:**

Thanks, Robin. I'm really excited to be here.

**Robin Salverson:**

I'm excited to have you too. You are new to both South Dakota State University and also to the state of South Dakota. For our listeners, could you share a little bit more about yourself?

**Dr. Swanson:**

Yes, absolutely. First and foremost, I'm really excited to be here and really excited to start to meet all of the stakeholders and producers and everyone I'm going to get to work with in this position, but I'll take it all the way back to maybe my childhood. I was born and raised in Northern California in a town in Vacaville, California right in the middle of Sacramento and San Francisco. My parents worked in the Bay Area, but we lived in Vacaville just for a little bit of that maybe suburban safety life and we had a small ranchette with a variety of livestock species and that's kind of really where the trajectory of my involvement in agriculture began. My sister was involved in 4H and then as I got older, I became involved in FFA where I raised hogs and cattle county fair, a little bit of jackpotting, but nothing too fancy on the show side, and I knew I really wanted to stay in agriculture so I moved just a bit north to Chico, California and there I got a Bachelor's degree in Animal Science and Agricultural Business from California State University Chico. While I was there, I actually worked at the beef unit and I was involved in undergraduate research and I got to take my data - it was a heifer development program to a national animal science meeting, and from there, I knew that was kind of my aha moment that research was something that really interested me and I wanted to continue, and so that took me on a path to do a master's degree at the University of Nebraska Lincoln with Dustin Yates and from there, I knew I wanted to end up working in a professor research role and so I needed a PhD to do that. I moved down to Mississippi and I earned my PhD in Reproductive Physiology at Mississippi State University and then I did a short year just north at NDSU for a postdoc before beginning here at SDSU as Assistant Professor of Reproductive Physiology where I mostly have a research appointment and then I'll teach undergraduate and graduate students a little bit throughout my program.

**Robin Salverson:**

During your master's program in Nebraska, what was your focus?

**Dr. Swanson:**

My focus in Nebraska was stress physiology. I actually did heat stress work and then beta-adrenergic agonist work so I specifically worked with ractopamine in feedlot animals under stressor conditions.

**Robin Salverson:**

What is ractopamine for the listeners?

**Dr. Swanson:**

Sure. Ractopamine, probably the most common brand - name that you'll hear it called as Paylean, which was really used heavily on the hog side before they went away with using it in hogs. It is used in the final portion of feedlot animals. I think it's only 21 to 28 days. If it's beta-1 versus beta-2, they have different timelines just to get that final lean mass on the animal. It will decrease fat a little bit so that's why we just do it at the end because we obviously also want intramuscular fat in our animals. We don't want to decrease it too much. Really, the basis of my study was that beta-2 agonist, which is zilpaterol or Zilmax, some of those products, you will no longer see them being utilized in feedlots because of some anecdotal evidence that people were saying it was causing lameness or health issues, and we thought perhaps on their own they don't, but maybe when an animal is already under a stressor and then we're adding this extra physiological component that perhaps we're exacerbating stress. That was really the basis of my study and several studies after mine and none of them have been able to find any evidence that using these products causes any health and well-being issues among our livestock species, which I think is really a positive thing because we want to be able to use these tools to increase efficiency of feedlot systems or beef systems in general and so that was the basis of my work there.

**Robin Salverson:**

You've had a [Laughter] really diverse background in joining us from California, growing up in California, experiencing agricultural activities as a youth, coming to the Midwest to Nebraska, back down in Mississippi into reproductive physiology, back up to North Dakota and from the feed yard world to the cow/calf world too, because my assumption is when you were in Mississippi, you worked on the cow/calf side of things?

**Dr. Swanson:**

That’s correct.

**Robin Salverson:**

Yes, so you've got a [Laughter] really diverse background if they feel that you're in South Dakota now. Glad you're not in North Dakota anymore. [Laughter]Glad you're in South Dakota. I won't hold that against you. [Laughter] We love our friends to the north. You had mentioned that your role is really you have a kind of a two-part role here with South Dakota State University as you're assistant professor, you said both teaching and research. Is that correct?

**Dr. Swanson:**

That's correct.

**Robin Salverson:**

Even though you're kind of in that teaching and research role, you really want to be able to connect with the stakeholders and producers across the state and that's typically like the extension world, but I know that you have a true passion in that.

**Dr. Swanson:**

Yes, absolutely. I would say, yes, I don't have technically an official role where it is my job duty to do Extension programming or maybe it's clearly defined as a job duty for me to go on interact with producers, but at the end of the day, as someone that is researching within the beef cattle production system, producers are my stakeholders and specifically South Dakota producers are who I am here to research for and serve. I want to meet producers, I want to hear what they need from us and what I can be doing and of course share what I am doing so that maybe they know what's up and coming and in those ways. One of the best ways I can do that is to do things like work with Extension personnel where you have those tied relationships with the producers.

**Robin Salverson:**

Excellent. I'm really excited during this episode of Cattle HQ that our producers in South Dakota can learn more about you, learn more about your research and also hopefully, help provide that connection between you and our producers or your stakeholders. With that, what is your general mission for your research at South Dakota State University?

**Dr. Swanson:**

Yes. Over the past several years starting at my time within my PhD program and through my postdoc and now, my main focus within Reproductive Physiology is pregnancy efficiency. We typically in the northern plains and other production systems within the United States and throughout the world, we'll see body loss, body condition loss, in heifers and cows in early gestation. I mean that's really to do mostly with just seasonal changes and forage availability and quality, but also things like we experienced this year such as drought as we moved into the breeding season or even extended years where we have really long late winters. One of the best ways you would think, "Okay, how do we overcome that body weight loss is to feed." Well, we know in production systems that feed costs are the most expensive proportion and they're continually rising every single year with an expectation that they will continue to do so, and so it's not really feasible especially if you start to consider labor and infrastructure associated with those feed costs to keep it dry and safe and then get it out to the animals. The problem is that we see when we have this body condition loss in early pregnancy, we're really not setting up that embryo or fetus for optimum production efficiency once it's a calf on the ground whether that be for the cow/calf producer and morbidity, getting sick a lot as a calf, not having the best weaning weights, but even then will we think about moving on to the growing phase and in the feed yard, are we getting enough muscle mass and fat deposition rapid enough for it to be a truly efficient process? So my work focuses on trying to find interventions or possible positive impacts we can make during those stressors such as nutrient stress, body condition loss which also can be impacted by heat stress and other kind of natural disasters. What can we do during that early gestation phase to ensure we are capitalizing our efficiency of our production system as early as possible by targeting the fetal stage of the next cycle of the beef system?

**Robin Salverson:**

Why is this type of research so important to you? You talked about the producers, but why is it important to you as a researcher?

**Dr. Swanson:**

I, first and foremost, just have a huge passion for cow/calf production, but I think too if you really think about it, we don't talk about it enough, beef is a high quality protein product that provides micronutrients to the human diet and the amount of protein consumption, particularly high quality proteins such as animal meat, is directly tied to human health and well-being. As we see steady and increasing demand for beef in the United States as well as an expected increase in international demand as we look to the next 10, 20, 30 years, we have to be able to stay in health and well-being of humankind and the best way we can do that is to ensure we are providing this high quality protein source for human consumption, which we do really well, but at some point if we don't start to improve reproductive efficiency, we're going to face challenges in doing that. It's my perspective that we've done a really incredible job increasing production efficiency from a nutrition and genetic standpoint and we've done many, many great things on the reproductive side if you just think about some of the technologies that producers can utilize now, but I think that this particular area of pregnancy is fairly newly studied probably in the last maybe 20 years it's become more popular and more well understood that it is a gap in our understanding of the production system and so I think it's just really exciting for me that there's so much opportunity there and how much it can really matter to humanity not just our producers, but everybody. They should be eating this high quality protein for their health and well-being.

**Robin Salverson:**

Excellent. With that all being said, in regards to your research projects, your current research projects, what are you currently working on?

**Dr. Swanson:**

Right now I have some very beginning stage research going on and some of that has to do with heifer development so preparing those heifers as we move from their first cycle, the first time they express estrus and ovulate through the beginning of their first pregnancy. Heifers in particular are even more challenging than a cow because when we're breeding them, they're still growing themselves, right? we're usually only breeding them about 65% of their mature body weight and so with that, they're utilizing their nutrients for their own growth first, but then they're going to start growing an embryo into a fetus and a calf and so focusing on some ways to maximize reproductive efficiency in heifers without again feeding additional feed stuffs particularly or making ways that it's feasible and cost effective, and then I also have some work investigating ways to improve blood flow to the placenta. The thought on that is if we can increase the blood flowing from the mother to the fetus, we are likely increasing the amount of nutrients that are getting to that fetus and so hopefully having a positive impact on fetal growth and development through that avenue. Those are kind of the two aspects that we're working on in my lab right now.

**Robin Salverson:**

For that first project you mentioned, I think is such a value because we know that the typical drop out - when cows start to drop out are those two-year-olds because of lots of things [Laughter] happening with that animal and I really appreciate the projects you're working on. Hopefully, with the project that you talked about should help us retain those two-year-olds that have been typically dropping out. Am I understanding that right?

**Dr. Swanson:**

Yes, absolutely. This is certainly a goal. Actually, last night we had a bit of a conversation here in Brookings with Dr. Jessica Drum, who's also a part of the South Dakota Beef team on the Extension and research side. We did talk about that a lot too where when we get from that heifer - she has a calf at her side now maybe 85% to 90% of her mature body weight and we're asking her to cycle and rebreed as soon as possible so we can have that short calving window, tight calf crop and that is where we see a lot of dropout. Again, yes, how can we improve reproductive efficiency to ensure we get longevity of our herds and we're not losing that massive investment? I mean they're one of the greatest investments the producer is going to make is in their replacement females.

**Robin Salverson:**

That's the current research that you are working on and I look [Laughter] forward to hearing more of the data as it comes out and we'll just have you back on the podcast again to get it out to our producers. What are some thoughts on some upcoming projects that you would like to do in addition to the current ones?

**Dr. Swanson:**

That's a good question. Really I think I'm going to stay in that fetal programming realm for probably most of my career, really stay within studying pregnancy and working on the placenta and fetal growth and things like that. I've mentioned a lot and I am this person where we have done for about the last 20 years a ton of research to understand the negative impacts of poor nutrient status or stressor events within our herds during pregnancy, but we really don't have a good answer right now for what producer should do about it and so really I look to while still working to do some - understand and continue to evolve what we do know about the process. I would really like to shift and start to develop either products and/or maybe management techniques that we can actually take to the producer for them to utilize, to maximize efficiency. At some point, the research needs to turn from being research to actually being applicable to our customer base. That's really where I look to the future is trying to work on actually developing some of these research ideas into something a producer can actually utilize within their operation fairly easily and of course in a cost-effective manner.

**Robin Salverson:**

Absolutely, because I think input costs are so high right now and like you said, heifer development cost are a lot and then just the additional production cost in general for that cow just keeps increasing, keeps increasing keeps, increasing and when you talk to producers, they're wanting to [Laughter] decrease the production costs, those yearly production costs. I appreciate what you said about reducing that cost and maybe looking not necessarily at additional products that should be thrown at those cows or those heifers, but maybe even some just general management things that producers can do that are already readily accessible to them and they just need to change the management. As you've been talking, it's really about helping the producers and so like we talked at the very beginning of this podcast, you really do have the interest of the producers in mind and really want to learn the issues that they're experiencing. How are you proposing to do that? How are you proposing to work with producers in our state to help identify those issues? If you could explain on that.

**Dr. Swanson:**

Yes, that's a good question. I will say that I've only been here for a few months, but I've tried really hard to make sure that I'm making it out to things that producers are going to attend so that I can start to just meet people and develop those relationships so that I can work on those conversations. I was able to attend the Prime Time Gala this past weekend. I went to our bull sale here at SDSU as well as our Cow-Calf Research and Education facility. We have a board that essentially gives us feedback to help us understand what we're doing well, what they would like to see from us, and that's made-up of our stakeholders including producers so I already got to meet several producers at some of those type of events. Then going forward, I know Extension, you guys will have repro AI boot camps or other Extension programming and beef field days so ways that I can attend and meet people through that and just try to attend events that producers already know about and believe in and we'll show up too so that I can start to meet them. Then something else that we recently talked about was actually having those of us that participate in research take our graduate students and some of their posters with their research and their findings to the cattlemen's meeting each year. I don't know if we're going to make it this year that we started to have conversations with them about that, but we had kind of asked I think a little bit late.

**Robin Salverson:**

Well, I will offer the opportunity to always come out to Western South Dakota. I would love to have you. [Laughter]

**Dr. Swanson:**

Yes, I need to make it out that way.

**Robin Salverson:**

[Laughter] I'd love to introduce you to some of our producers out here whether that's just a ranch visit or some meetings or something like that so give me a holler and we'll get that set up sometime. I think it's also a great idea to get out the research that the graduate students are doing because there's so much research that is going on that maybe doesn't always get in front of our producers. There's a lot of really good applied research projects going on at SDSU Extension within the animal science department so I appreciate what you're saying about getting posters up and some articles or whatnot about our graduate student research because you guys have a really dynamic group of graduate students in the Animal Science Department.

**Dr. Swanson:**

Yes, and I think too it's a wonderful opportunity for our students to also be able to talk to their stakeholders because I'll be the first to admit those of us heavy on the research side don't always do a great job at that and we need to because like I said, there are stakeholders in there who we're here to serve and so I think sharing that and sharing it effectively is really important training for our students as well.

**Robin Salverson:**

You might find that some of your graduate students might want to go into the world of Extension, which we want more of. I'm in one of [[Unintelligible]](http://recordings.civi.com/cgi-bin/player.php?file=PC-00002-CattleHQ-Ep-63.mp3&starttime=1256&duration=20) Extension so I know I want more colleagues to work with and more really bright-minded young people to join our team. We have been talking about your current and future research and where you would like your research to go, but could you highlight some of the past research projects that you've been involved in and more specifically how those projects would impact our listeners?

**Dr. Swanson:**

Yes. I briefly touched on some of my work at Nebraska, which really I think is such an important point that as an industry that we face oftentimes in agriculture as a whole animal agriculture in particular, a lot of misconceptions about what we do and what we are and I think that's been exacerbated a lot by the day and age that we live in of social media. I think that one of my biggest takeaways from some of that beta-adrenergic agonist work that I did was really that we are not utilizing our products that is causing health and well-being issues in our feedlot systems that has not been substantiated by any research project that has ever been performed using them just even outside of my project in my lab group and so I think that's really important. Then there has been some research, so I've worked with melatonin, which most people when they think of melatonin, they think about the sleep aid, but really melatonin also helps modulate blood flow. We did some work to see if we could improve blood flow to the placenta and have a positive impact on fetal growth during mid gestation. That was during my time at Mississippi and we found some really interesting results where we saw a seasonal effect. We had fall calving and spring calving cows and we did see that melatonin helped modulate blood flow and helped improve birth or fetal weights, but only in the spring, not in the fall, which we attribute to the fact that those fall animals maybe already had increased melatonin in their system because of the day length differences between those two seasons so that's some interesting work that I think will hopefully be something that we can continue to work on whether that's a management technique or some kind of therapeutic technique going forward.

Then another big project I did was using a multi-supplement so two injectable supplements and two fed supplements. They're pretty affordable, very easy to use during all stages of gestation. We fed them at early gestation and then we evaluated the fetus early gestation, mid-gestation, and late gestation and we did that because each stage of gestation kind of has its different important components, if you will. Early gestation, we're thinking about the creation of the organs. Mid-gestation, we start to think about skeletal muscles specifically, and then late gestation is when the largest amount of fetal growth is going to occur and so it's finding that balance of how these things are impacting each stage of gestation so that we don't have to say, "Hey, we have this product, but you have to use it every day for 285 days." It's again not feasible for our production systems. I've done some work on that and I would say that's very preliminary probably not anywhere near what we can use at the producer level yet, but I think we do have some important findings that really may just come down to management techniques even considering producers that utilize artificial insemination. Can they just give one extra shot during their estrus synchronization protocols or can we just give one extra shot when we're doing pre-breeding vaccines and things like that in order to help maximize some of that efficiency, but probably in the pretty early stages on that project specifically.

**Robin Salverson:**

Inquiring minds want to know or probably just my mind, how do you sell feed melatonin? I'm assuming it was a dietary, some type that you added into the diet. You didn't take a whole bunch of little melatonin pillows and break the capsule open, I'm [Laughter] assuming, or forced to eat it I guess. [Laughter] How did you feed melatonin? I'm just really curious.

**Dr. Swanson:**

No, it's a good question. We actually did purchase from a scientific chemical company 100% pure melatonin just because a lot of what you can buy in the store is not always 100% melatonin and we wanted to give a very specific dosage. It came in a powder form and we dissolved the powder in ethanol, just 100% alcohol, and then we just took a pound of fine ground corn and we poured the amount of ethanol over it that would give us the correct dose and so then the ethanol will evaporate off and the melatonin stays within the corn and then we just feed them the corn supplement and we used a Calan feeding system so that they would individually consume their exact amount each day.

**Robin Salverson:**

Makes sense. I was dreaming of Gummy Bear melatonin [[Crosstalk]](https://recordings.civi.com/cgi-bin/player.php?file=PC-00002-CattleHQ-Ep-63.mp3&starttime=1586&duration=20) [Laughter] right?

**Dr. Swanson:**

That would be good. [Laughter]

**Robing Salverson:**

Before we end this episode of Cattle HQ, do you have any last minute thoughts or comments?

**Dr. Swanson:**

Really just thank you so much for having me. I'm really excited to be here at SDSU and be a resident of South Dakota and serve our producers. I'm looking forward to meeting everyone so I'm just really appreciative of the opportunity to hopefully start to meet people through this podcast. I hope anyone listening will reach out to me via e-mail or phone if they have any thoughts or ideas or just want to talk and get to know me. I'm obviously appreciative of you and the rest of the Extension team for putting together this podcast. I think it's a really important and valuable way to reach people.

**Robin Salverson:**

I know I'm very appreciative to have you on this podcast, on our team with SDSU, and look forward to working with you in the future in any capacity that I can. As you mentioned, you would love to hear back from producers, get some input from them so what's your phone number?

**Dr. Swanson:**

My phone number is (605) 688-5417.

**Robin Salverson:**

You said (605) 688-5417 is your phone number.

**Dr. Swanson:**

That's correct.

**Robin Salverson:**

Awesome. Well, I guess to all of our listeners out there, if you have any thoughts, suggestions, curiosity, about what Dr. Swanson is doing, give her a holler. I know she'd appreciate visiting with you. Once again, this has been Cattle HQ brought to you by SDSU Extension Headquarters for all things beef cattle. Visit extension.sdstate.edu for the latest beef information. Until our next episode, remember it takes more muscles to frown than it does to smile.

**Kiernan Brandt:**

Thank you for tuning into this episode of Cattle HQ. Brought to you by SDSU Extension, headquarters for all things beef. We invite you to visit extension.sdstate.edu for the latest beef information as well as subscribe to the show on Spotify. You will also find show notes and resources from today’s episode, until next time. Remember, success is not a goal, it’s a byproduct.

[Outro music]