## Calving Distribution and Herd Health

## Season 1, Episode 9

**[Music]**

**Olivia Amundson:** Welcome back to another episode of Cattle HQ. Today we're joined by Dr. Julie Walker as well as Dr. Salo Zoca. I'm going to let both of these to introduce themselves to get you a little bit oriented with what they do so, Dr. Julie, would you, or Dr. Walker would you go ahead and introduce yourself.

**Julie Walker:** I like Dr. Julie better. So I'm an extension beef specialists at SDSU and I've been around for a while. I'm a nutritionist by training, but I have done a lot of collaborative research in the reproduction, because I truly believe nutrition and reproduction are tied hand in hand, so…

**Olivia Amundson**: So she's very important to have on this team. Dr. Zoca would you go ahead and introduce yourself and tell us a little bit about what you do and what you research.

**Saulo Zoca:** Thank you for inviting you for this podcast. So I’m currently a postdoc mentored by Dr. Walker here at South Dakota State University or SDSU. My main focus of research has been in the male side and trying to understand why some bulls are different than other bulls in the field, and when we use them for AI or even natural service, and how can we find new fertility markers to better predict their low fertility.

**Olivia Amundson:** Yeah doing a lot of cool stuff, especially on the bull side, sometimes the side that maybe get some little bit forgotten about a times, so really excited to see what Saulo comes up with and finds in some of his research.

So today we're going to have a discussion with Dr. Walker as well as Dr. Zoca. This originally was going to be a Beef Day presentation that we've now made into a podcast I'm really excited to have this conversation with the both of them we're just going to be discussing some research that's been conducted at SDSU in the beef reproductive physiology lab. As well as Julie, we don't want to dismiss the fact that successful reproduction is not possible without proper nutrition, so that is why Julie, is very important in this whole research group. So today we're going to discuss some of the research that was done and is continuing, but one that was a multi-level, as well as a multi-year project, looking at the influence of estrous synchronization utilizing both natural service and AI on herd profitability, as well as understanding the influence that sexed semen and may have on the operation. We're also going to then discuss a little bit about bull fertility like Saulo mentioned that he kind of works on right now. Talk about finding some of those new markers to detect fertility, as well as some new methods for pregnancy detection. So, with that let's start talking about that project that was done at SDSU that was a multi-year, multi-level project, Julie, can you tell us a little bit more about this project.

**Julie Walker:** Yeah so, Dr. George Perry and I got a grant to look at three different levels so we looked at. Not synchronizing and synchronizing with natural service, and so we did that in that was called Level one. Level two was doing synchronized natural service to AI and then the last level was um synchronized AI with conventional semen or non-sexed semen and then AI’d with sexed semen. So we looked at those three different levels, and so the other thing we did this, we did this on producers operation, so it wasn't like oh, you have more help at the university or those kind of thing, so this was done at producer’s places with all of the trials and tribulations that happen on producer’s places.

**Olivia Amundson**: I was going to ask did you run into scenarios, where you had to kind of think outside the box to get these get these jobs accomplished.

**Julie Walker:** Yeah we had seven pastures at one producers place so we started in the morning, you know, like point CIDR’s and then we had to make sure we were staggering them to ensure, when we go to breed them that we'd have enough time, and so my phone got dropped in the chute as we’re trying to pull CIDR’s at midnight or pitch dark and giving shots so it was a fun time.

**Olivia Amundson:** Where there’s a will there's a way.

**Julie Walker:** Yeah I'm pretty creative so um it's interesting and the whole reason we did this is because we know that those calves that are born earlier will give you more weight at weaning and ultimately make them more uniform calf crop, if I can talk today so by grouping those up, we can change the calving distribution. And so it becomes critically important for profitability marketing those calves those kind of things so that's the whole reason we did this was so that we could be successful and help producers. And we know not all producers would be like wanting to go to sexed semen, so we thought we would do it in three levels so people could understand and find where they were comfortable and so that's why we did the three different levels.

**Olivia Amundson:** Well I think that's I think that was the really neat as part about this project is you're really were able to kind of to reach producers at different levels, ones that maybe we're not necessarily set up or ready to do an estrous synchronization with artificial insemination, or maybe a producer who didn't really necessarily have a need for sexed semen at that time. But just kind of going back to talking about the increase in weaning weights wasn't it the USDA Meat Animal Research Center that did some research and they actually found that one day of age difference at weaning translates to two and a half pounds less weaning weight. So simply just within one day difference of a calf being born they're going to probably be two pounds heavier than at weaning. You know so which I think is I mean that's huge because a lot of times our producers are being paid, you know at time of weaning and so if we, and they're getting paid based on weight and so, if we're able to increase that weight of those calves ultimately that's going to make us a more profitable operation.

**Julie Walker:** So I just looked at it like, so we can move them up one cycle 21 days I'm going to cowboy math. Two pounds times 21 and is 40 pounds so I'm going to get 40 more than 40 pounds of extra weaning weight, given the same scenario. So when we looked at the non-synchronize versus the synchronized with natural service, so we just turned the balls out and we had these cows in the same pasture those kind of scenarios, so there wasn't like different feed there wasn't anything we got 62% with a synchronized versus 47 in the first 14 days. So I moved, you know about 15% more pregnant, in the first 14 days when we looked at the first 21 days we didn't see a difference, they were in the 70%. So we got about 70 or 75% depending on if they're synchronized or non-synchronized, pregnant in the first 21 days and so to me that we had the impact we wanted, we didn't really see it in the 21 days. But Okay, you also have to think about the producers we're working with if they're really willing to try some things they're pretty good managers, because we needed records those kind of things so it's not like. And they weren't really spread out to start with, so the cows were relatively grouped up so we thought that was really kind of good you know, and so we increased in the first 14 days, so you know we're looking at, 15 more calves having a few more pounds on them so improving that distribution. So um we did these all the synchronization with CIDR’s. So we use the 7-d CIDR and then we did fix-timed AI (FTAI). So then, if we looked at the synchronized AI versus the not the synchronized natural service. We were anticipating that we would see more than AI bred by that and research is a great and wonderful thing and it doesn't always turn out like you wanted and we found that the synchronized natural service actually had higher conception rates or preg-rates than the synchronized with AI for the first 14 days. So those were statistically different about 7%, 9% somewhere in that ballpark less than 10% different, but when we got to 21 days we didn't find a statistical difference, but again, they were about 14% difference in preg-rate going to the natural service, so you may say, well, that was a flop. You were going to say something, Olivia?

**Olivia Amundson:** I was just going to say so, if I could bring Saulo in for maybe a hot minute what, why would we see those sort of results on this on using natural service versus AI?

**Julie Walker:** Well, one of the things are those bulls they might been really fertile.

**Olivia Amundson:** Absolutely I'm just I'm just stimulating conversation I don't know I mean really is there is there a difference?

**Saulo Zoca:** One thing that I think it's interesting to look at if we compare the results we got in both ears, with the natural service we got about the same percentage with the synchronization and natural service within the first 14 days and then, what do we got for the synchronization AI here, it's a little bit lower than what we would expect and it's very hard to pinpoint what exactly happened for that a little bit lower than what we would expect. But the data is the data and it doesn't matter, if happened this time it may happen somewhere else.

**Olivia Amundson:** Absolutely, and we can also probably say that you know when bulls are breeding cows, there is a higher volume of semen that are going into those cows that are more likely going to get those females pregnant and a lot of times bulls are able to find a cow and heat before we as humans are able to find a cow and heat. So there's just probably some of those physiological things that are occurring that are having that advantage over it, as well, would you say that's true.

**Julie Walker:** Well, yes, the other thing is, you have to realize because we wanted to know who is AI and who is natural service they had to hold their goals for 10 days, so those natural service bulls were working those 10 days. So, if someone was coming into heat or off just a little later from AI and such they might not have been the semen may be done. That we put in AI versus the bulls right there to serve us some and so. You know the other thing we need to probably look at, is when we looked at, who has in estrus and who wasn't in estrus what impact that had in this because we did do that with the sexed semen. And the other thing is, it takes a little while when you're synchronizing everything up to get everything to flow, the way we want, so you know this is year two verses so those had been grouped up in year one, so I think those might be some factors to that go into that.

**Olivia Amundson:** Now there's definitely research that shows that the more consistent, you are with estrous synchronization the higher those conception rates, or pregnancy rates will be. So, yeah, I was just curious if you guys had some insight on to maybe why that was so.

**Julie Walker:** Well yeah but I agree totally you know it's the volume of semen that's deposited, timing, all of those things, and when we remove those bulls for 10 days that has a huge impact, so. I just think, but I think it's worthwhile and under no circumstances, am I, I am a true believer in synchronizing and AI not wanting to say that on, but we also got about 50% so if we can move 50% up you know kind of thing into those first 21 days that makes everyone happy and we have a much more uniform calf crop and such so again we get that 40 pounds on that calf so.

**Olivia Amundson:** Absolutely one more question before we move on to some of the results from some of those other the other levels that you had there. Why was a CIDR was incorporated for this estrous synchronization program.

**Julie Walker**: Well, we wanted to be consistent and so a CIDR technology, so we used the 7-d CIDR protocol, and so we just did that to be consistent um and there's other ones out there that might be better or worse, give better results right now than the 7-d, but the reality of that is when we started the project, we wanted to stay consistent throughout, and so we use the seven day because.

Then a producer knew I was going to be there on Tuesday I was going to be there on the next Tuesday versus oh is it Monday or Tuesday, this week, or is it Tuesday and then Monday next week, and so it was just easier when working with producers that we're on the same day, and when I hit 10 producers and multiple people breeding on the same days, I needed producer A to be on Monday and be producer B to be on Tuesday and producer C on Wednesday. So for us at the university getting there, facilitating these things a 7-d made it much cleaner for us in that realm.

**Olivia Amundson:** The other thing I was thinking about is, I suppose, with using multi-producer herds you don't necessarily know, like as far as when they're done calving what part, you know how far along postpartum some of those are. And so, essentially that CIDR is going to help kind of group all of those cows up and maybe some cows that maybe are in anestrus, it's going to allow some of those cows to maybe start recycling, so I suppose it helps in multiple aspects in terms of making sure that you are getting the most, the greatest amount of those cows to come into heat and get bred.

**Julie Walker:** We didn't know when they were they kept the previous year, though.

**Olivia Amundson:** So okay, okay.

**Julie Walker:** We did have that, but we didn't sort on that. So, so no it's we are going to go to produce or Smith's herd and we're going to implement this, animal one gets treatment one, animal two gets treatment two, you know we just went back and forth in that so wasn't we try to like Okay, if there was a big group that we could get group so half of them were in each but we tried to split those between so it wasn't like all of the early bred one's got into the natural service or the AI we tried to split them evenly as much as we could, but again we're working on producers places and sometimes we would get the information afterwards, instead of before.

**Olivia Amundson:** And just thinking like you know for producers, who are listening to this podcast and they're thinking Okay, what would be potentially a good protocol to use, you know what protocol, did you guys use, do I have to use this eater protocol and I guess mainly what I want to get at is every situation is going to be different, but just some of the thoughts to why you guys use the 7-d CIDR for this project.

**Julie Walker:** Right and the other issue, is what I would say is if they're debating which protocol, just to go look at all the options are out there and they can visit with myself I've been doing, I know I'm a nutritionist by training, but I understand the reproductive protocols I'm if I'm not here I'll just pass you on to my postdoc, Saulo for those questions we have wonderful Extension Field Specialist out there that can answer those because Olivia, Kiernan and Robin all have masters in reproduction, so they can all answer those questions. So there's a lot of places, you can bounce questions off of there's a lot of people out and industry, you can bounce those, your neighbors whoever to figure out what's going to work for your operation, and it may be very different depending on if you are working in town or if ranching or farming is your full time job those will have an impact on what fits for your operation.

**Olivia Amundson:** Absolutely.

**Saulo Zoca:** If I can say something right now. So another good resources if you want, if at any producers one to find what protocols are available and have been proven to work. Go to the beefrepro.org website and the beef reproductive task force is the one that manages that website and there is several researchers involved with putting together a spreadsheet that they have there it's a great resource to for any producers that want to learn some more about reproduction.

**Olivia Amundson:** Yeah absolutely so that will be involved or that will be incorporated into the transcript as well as I'll put that as a resource on this podcast. We, I know we've discussed the Beef Repro Task Force on previous podcasts, but I think it's always super important to continue to bring those things up, so that, guys know that it's available and things like that so. That was a really good discussion on that level one let's continue on with how some of the research, or let's continue on with the rest of this research and what some of the results that you guys saw were.

**Julie Walker:** Well, so we talked about Level one and Level two so um Level two didn't turn out exactly how we had planned on it so then, Saulo’s laughing, but that's called research and we can't change that. So the last level was looking at conventional versus sexed semen, and so you may say, why did we even consider this? So the grant was working with small and medium sized producers, so those producers that have less than 100 cows, so we know by natural selection 50% will be female 50% will be male or there about. And so, is there a way that we can shift it to I'm going to sell everything at weaning can I shift it to 70% steers or male. And then I'm going to make into steers or I want to develop replacement heifers so do I want to shift it to 70-75%, 80% heifers and so that's why we were looking at, so we can have more uniform calf crop so that was the purpose of doing the gender select. Our magical thing was okay small producers are probably not going to be keeping, they're going to sell everything at termination so we're going to use sex semen and we're going to use male, well that would be perfect in a wonderful world if we could have gotten sexed male semen, and so that wasn't available, so we use female. The results will be the same if you is X or y sorted semen. What we did was we know typically with sexed semen, we see lower conception rates, or we get lower conception rates with sexed semen versus conventional. Our research shows exactly that so in the first 14 days we had on the conventional was about 60% and on the sexed semen, it was about 45% so exactly where we anticipated and in the first 21 days we had 70 versus 52 these were not statistically different, but in my book, those are biologically different in my pocket book. The other thing we looked at is if they were in estrus versus not in estrus we got better results when they were in estrus. And so we know if we're going to use sexed semen, we really want those cows being estrus of showing estrus. If you need that research we have published that paper that shows that. So we found that out, and so, even though we didn't get as high of conception rates when we looked at the number of desired sex in this case female we got 84% versus 60 or 68%, and so we did shift on John Hall at University of Idaho has sown the same thing over and over again and he's used y chromosome type semen, and so we were able to shift the population. Our producer said they had some really nice heifers to use in the replacement plans, instead of you know terminal males that they would use in the feedlot but so we found exactly what we were expecting with the sexed semen versus conventional, but the question is, I don't think that's right for everyone, I personally don't think everyone's going to give up some differences in conception rate. Shifting some of the calves, the cows, to be in conceiving later to get more one gender or the other, you need to have a reason and for those small producers that need, you know, if I have a pen lot of males to ship, then I have the possibility of making more. In the sale barn, we know that if I have a bigger lot same sex I'll get better dollars so that's why we did this, but it's also I think it's cool if you're wanting to develop heifers, go find the ones that you want, and the other thing I want to say is our conventional bulls were the same as our sex bulls so there was no fertility differences, that we know of between these two bulls because we use the same bulls, same five bulls in the conventional and in the sexed semen, so they were the same bulls in both groups.

**Olivia Amundson:** Alright, so I got some thoughts so again for these girls that you used both conventional and sexed, do you use that 7-d CIDR protocol. And now something, and maybe even Saulo can speak a little bit more on this, because I know one of your good friends did a lot of research on this was different synchronization protocols with sexed semen and how that can maybe increase consumption with sexed semen. That may have also been another factor, and that is something that is also on that beef reproductive Task Force page, is now they have their own separate page with protocols for sexed semen, so you could have maybe, I'm not saying for sure, but you could have maybe seeing increasing conception from using potentially a different protocol. My Other question was going back to Julie, you were saying you use the same bulls one was sorted one was conventional or that you use semen from the same bulls sort of unconventional. Saulo, my question is, even though a cow or a bull you use his semen, or you use conventional semen, and he maybe has a decent fertility, can it be affected when we start sorting that semen.

**Saulo Zoca:** Yeah so regardless of the method that we use for the sexed semen, the semen pass through a flow cytometer. And then it's a lot of pressure, a laser heating these sperm and the dye going into this sperm, so there's a lot of things that we don't know for sure how much each one of those things during the processing to have that sexed semen impacts. So what we believe is that processing is what it ends up causing the decrease in and there is definitely differences between both so some bulls are more impacted and others when we do with this sexing process.

**Julie Walker:** But also make sure that all those bulls even with the sexed semen still have to pass the standards for the AI test ready. We had other bulls we wanted and those bulls couldn’t, the sexed semen couldn’t pass the standard, so we didn't use those so even though we're saying those because I agree 100% with Saulo’s comments is they still had to pass the expectations of the company.

**Olivia Amundson:** yeah and you're absolutely right Julie, because you'll have a bull that does wonderfully on a conventional standpoint but as soon as they sort sex his semen, all of a sudden, you know it just doesn't work anymore, and so you literally cannot get sexed semen from that bull, so I was just curious.

**Saulo Zoca:** I think any producer that is interested in using sexed semen, I think they should also incorporate a method of estrus detection, so to use only sexed semen in those females that have shown estrus because there is multiple research that it will show that have reported those females that show estrus have a much better conception, with the sexed semen compared to those that don't show estrus. And then, when most of the research will compare percentage wise of the sexed semen compared to conventional. And those that show estrus are very close to that 90% so very close to other conventional semen gets, but when we get those females that don't show estrous there is a greater difference between the conventional to the sexed.

**Olivia Amundson:** Something to consider when utilizing sexed semen is, it is probably going to be a little bit more labor intensive, to get that higher conception rate, so you kind of have to kind of decide if that's worth your time and really what you want to accomplish. So Julie, is there anything else you want to say to kind of wrap up this research that you looked at, you know overall results and takeaways from this research.

**Julie Walker:** Well, we know that the estrous synchronization you increase the number of calves that calved earlier and that's ultimately what we did, we just wanted to move those up. You know the other issues, all the producers, we have the economics and we're not going to talk about the economics today, but we have the economics also of what it costs to move those and to use the estrous synchronization, each producer needs to do that. The other thing is the sexed semen gave us the gender shift that we wanted and that were born earlier in the calving season, and so we achieve what we wanted, we also followed the calves to the feedlot and we're not going to talk about that, today, probably because we're going to run out of time and but If you're interested in that we also have that component of it, so we follow those calves through we didn't see anything super new or astonishing. Those calves that weighed more gave heavier carcasses, but we did see differences in weight at we need in such just like we would normally, and that was primarily due to age of the calf and so as we looked at that it goes right back to the US MARC data. We got more pounds per day of age, and so we just, it's important because those pals are consuming the same grass if the calf was born early or late, so we might also reap some benefit from it.

**Olivia Amundson:** And Julie, one of the statements that you actually have from some of this research is that the late born calves required 29 more days on feed to reach half a pound in body fat, right.

**Julie Walker:** oh no, no, no, no. So they require 28 or 29 more days, as you said, for a half inch a backfat.

**Olivia Amundson:** Half inch of backfat, okay.

**Julie Walker:** So yeah because that's what we were using as our gauge to determine when we're going to ship them so that was where we were visually appraising them to say if they were ready to ship or not. So, based on our visual appraisal and we were good and we met that on all of our groups, and so it took about 29 those calves are also about 29 days younger.

**Olivia Amundson:** Which, in what does that mean for producers now 29 more days additionally on feed, I mean.

**Julie Walker:** What right now Okay, so if that cow is on grass and it has a 29 day older calf or 29 day younger calf wherever you want to call it she's consuming probably the same. Feed out on pasture so our do I have as much to sell with that younger calf, no if I'm selling it as feeders and we know in South Dakota most of our producers, sell their calves as feeder calves. And that may be at weaning or going through a backgrounding phase, so either way they typically sell more within that realm. And so, as you think about that, that impacts my dollars and cents that I might have in my pocket and I haven't changed my impact on my natural resources and the other thing is, if I am feeding that calf, that also means I have 29 more days of yardage. How am I going to figure out when I'm going to ship this pen because they're less uniform if they're spread out further. So all of those come into play into that but also 29 days isn't huge it's a little over one cycle so we're just looking at most of the calves, I would have gotten would have been the later born calves would have been in that the cycle and a half later type thing so as we think about those just have some impact as we move forward.

**Olivia Amundson:** Absolutely I just think the research, you did was really it was really needed it really incorporated a lot of different aspects of using estrous synchronization conventional versus natural really just kind of grasping a lot of different ways that producers can really work to better define their calving distribution.

**Julie Walker:** Yeah well and the bottom line is, I know a lot of people get Red Books and they mark their dates down and they never looked at them, they never look at their calving distributions those kind of things. I think you know when people actually sit down and how many calves, you know how many calves they have in the first 21 days or the next, first 42 days or 63 days they can start telling some stories in work, then when they start analyzing those things they can actually say, Okay, what do I need are there problems, are they're not problems because there's a lot of the producers that were working with they were really synced up well to start with, so there really wasn't an issue there wasn't really any need to change their management, but I think some producers might benefit from considering what their calving distribution is and then making looking at techniques that might be able to group up their coach.

**Olivia Amundson:** Definitely and I'm just a huge proponent of that we all know that. I'm going to quickly shift topics here real quick and I want to have a quick conversation a little bit about this bull fertility, because I find this to be extremely intriguing and I kind of want to know the direction it may potentially have in the industry so Saulo, kind of just cowboy science for us here like we don't need to get super technical in the in the gene markers that we were looking at, but tell us a little bit about what you're working on what you found, and how can it be beneficial to producers for commercial producers well any kind of producers really in terms of getting their cows pregnant.

**Saulo Zoca:** What I'm going to be talking about here is my PhD work, so what I've done in the past three and a half years here in South Dakota. And really most of my work it's kind of behind the scenes and not directly to the producer but will help the producer. You know, our goal is to get to help the producer but we are working behind the scenes so it's kind of the work that a producer may not see directly but will impact down. And how does it work so right now, when we are talking about testing bulls and predicting both for fertility we are talking about doing breeding soundness exam. So we were going to call vet and he's going to come there and then going to look at the physical signs of the bull, do the scrotal circumference and do a semen analysis. That semen analysis is going to look at percentage of progressive motility and normal morphology sperm and that has been done for many, many years. There is a lot of research, that have tried to change our increase or that analysis modify so we could predict better the fertility of those bulls, but we have not explained better the bull fertility than what we do with the morphology and motility analysis, so my research is trying to understand okay those bulls that pass a breeding soundness exam, they have better fertility than those bulls that don't pass a breeding soundness exam and we know that for sure. But some of those bulls that do pass still are not highly fertile they’re some bulls that will have minimum requirements for motility and minimum requirements for morphology but they’ll still be sub-fertile. So when we look at so then some of my research, what we are trying to understand is that it could be a problem with the semen itself right, so the sperm. We are interested in looking at more on the molecular level in some portions so we know that semen it produces is stored into the epididymis of the bull for several days. Then it is ejaculated and lives very short, so what is actually causing that decrease in the longevity of the sperm after it's been ejaculated. If you understand that can we improve our ability to store semen, that's kind of our goal here so either using a fresh semen and it's just cold semen and using it and there's a few producers is that they use the chilled or cold semen. For AI not only the frozen semen that we use or even is there something else there that we can use for the frozen semen that can help us get better. So basically overall what we saw with this project, there was, we look at proteins, we look at pH and we saw that there is a difference on the metabolism of the sperm, in the epididymis so that will maintain that sperm actually not moving and then wanting to ejaculate and then shift the metabolism of that sperm, and it becomes highly mobile.

So that's one of the things that we know we saw that affects sperm longevity. Another thing is there's more antioxidants and those antioxidants that are present in the epididymis, decrease molecule such as reactive oxygen species that actually stimulate that sperm motility and increase that sperm motility still maintaining that sperm not motile. So those are some of the molecular things. Another thing that we saw with this research was that the pH also affects the longevity of the sperm. So there is a right, so if we decrease the pH, sperm becomes non-motile and changes, a little bit of the viability too. But also, if we go to high with that pH also we change the motility and changes the longevity so we found that on this research with three different pH’s that the pH’s around 6.8 was the best for increased longevity of that sperm.

So another thing that we are based on that research and we saw that there was a huge amount of proteins involved with the sperm. There was around 450-460 proteins that we identified. And then we're like Okay, can we use some of those proteins and create new fertility markers. And then we decided to study some of those proteins. The reason is, we are, we are trying to understand if those proteins, have any relationship with the fertility we’ve seen in the field, so we're really trying to add on to that breeding soundness exam or extend that quality control analysis that the AI studs are currently doing and improve our fertility prediction so not letting those sub-fertile bulls get into the field that's basically our goal, trying to remove more off those sub-fertile bulls.

**Olivia Amundson:** So there was really just a lot of things that you're looking at in terms of how it may be best incorporated maybe within a synchronization protocol, natural service, whether it's fresh semen whether it's frozen semen. So in terms of producers, using that or what you guys are doing and how it's going to affect the producer is really you guys will be able to kind of use this information and be like well this bull is going to be much more fertile when we use him in a natural service setting, this bull will be a lot more fertile when we're using it in maybe a TAI setting or a heat detection setting, etc., am I kind of getting that correct.

**Saulo Zoca:** Yes, so basically that's the ultimate goal right so selecting those bulls and finding those bulls that all have the highest fertility possible to get to the producer either doing artificial insemination or an natural service and the reason is, if we go back some of the old research, we can see that, when we have those sub-fertile bulls it takes more service for the cow to get pregnant, so it doesn't mean that that sub-fertile will not get cows pregnant, but will have lower percentage of cows pregnant each service, so now that all that Julie was saying that we are trying to shift and creates calves earlier, we’re using those sub-fertile bulls we shifted that calving distribution to be either evenly distributed throughout the breeding season, or the calving season or increase towards the late calving so now you're losing at pounds of calf weaning we likely are also losing on pregnancy rate, so all those factors will come into play when we were talking about having those sub-fertile bulls in the herd.

**Olivia Amundson:** Yeah I think that's believe me there's just been so much research done on the female side, and I think there's just been a lot of pinpointing in terms of timing of insemination, and how we're going to reach that maximum conception rate with a female. But now, if we can really incorporate some of that male aspect like what is that going to mean for the industry as a whole, I think I really think that research is going to be very beneficial in the long term and like you said it's kind of behind the scenes, but I think it'll have a huge impact.

One of the last things that you guys had in your presentation was talking about other ways to detect pregnancy in cattle. You guys want to talk a little bit about that, and maybe some of the different methods that are out there that producers could potentially incorporate instead of maybe having a veterinarian come on place to preg-check their cows using you know palpation or ultrasonography.

**Julie Walker:** So one of the grad students did her master's research looking at comparing the IDEXX type protocols to ultrasound. So all of them can be detected at about 28 to 30 days somewhere in that ballpark of pregnancy, but the reality is if I only have five cows or I have a handful of cows do I really want to pay for veterinarian or someone that can come and ultrasound out because what that cost is going to be? So she looked at, basically compared ultrasound to what we're going to call lateral flow and that's the IDEXX on farm pregnancy test and so that's kind of like the pregnancy test, you would do if you're a human, comparatively, if you're thinking about that it's a little thing you put a couple drops of blood in it it's individual so you can do one cow, so is my favorite cow that I bred pregnant? I could get one test run it at chute side at about 30 days and determine if she was pregnant or not or those kind of things. The other one is that IDEXX rapid digital test and that rapid digital test can be done within 30 minutes, so you get a big tray it has like 90 some wells in it you're going to put in the blood sample from each of animals, and then the solution based on the coloration you will decide if it's pregnant or not. Now that whole well is wasted, so you will probably want more than one cow, so it's not probably is easy to use it's a lateral flow one if you have a few numbers, or you just want to do a couple of cows. Now if you're doing a whole bunch the other one is an IDEXX ruminant pregnancy test and that one is sent off, so you send that off to a laboratory get the blood you send it off and it's done at a laboratory so that will take a little longer. The rapid visual and the lateral flow can be done chute side, or virtually chute side we'll call it probably cleaner and then chute side but um the other one needs to be sent off. So those are opportunities for smaller producers or if you don't want to pay for you can't get a veterinarian to come out you want to just do a quick test about your favorite maybe it’s your 4-H heifer, maybe it's your favorite cow. Maybe you just want to see if those heifers got bred on the first time or not so who's going to the feed yard kind of thing on some heifers. So those are, they all have very good correlations or agreements to ultrasound so we found very comparable similar results in the numbers, did they were they 100% fool proof no but neither is ultrasound, we know that, it's only as good as your technician as I jokingly say. So the reality of that is there other opportunities, particularly for smaller producers or maybe you want to do an early pregnancy test and then have them that come out and do the final one or something like that, at the end of the breeding season. So just some different opportunities out there for getting pregnancy tests, other than just ultrasound

**Olivia Amundson:** Yeah and I appreciate that what I'll do for our listeners is I will link sites to some of those different pregnancy detection methods so that if you guys were interested in doing something like that you guys would have that information available to go and find some of that. Well, you guys, I think that really kind of wraps up our conversation, so I really appreciate having both of you here with me thank you, Dr. Walker, thank you, Dr. Zoca for being here with us. And with that we wrap up our conversation talking about some of the reproductive technologies that are out there, and some of the research that's being done here at SDSU. Thank you for listening to cattle HQ brought to you by SDSU extension headquarters for all things beef.

**[Music]**