## Incorporating Sexed Semen into a Commercial Beef Herd

## Season 1, Episode 60

[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, a SDSU Extension Cow/Calf Field Specialist. I am joined by Kenny Wells to discuss how ABS Global has become incorporating sexed semen into the beef cattle industry. Welcome to Cattle HQ, Kenny. I’m really excited to have you on this episode.

**Kenny Wells:**

Yes, thanks for having me on. I’m really excited about being here today.

**Robin Salverson:**

During this episode we’re going to talk about the use of our artificial insemination or AI but more specifically the use of sexed semen in the commercial beef industry. Kenny, you work for ABS, could you share the mission of ABS and what your role is within that mission?

**Kenny Wells:**

Yes, I’d be happy to. Probably one of the things I’m proud of working at ABS is our vision statement. What we say we represent is we’re about pioneering animal genetic improvement to sustainably nourish the world. That’s a pretty noble thing really to get to come to work for on a day to day basis. I do think back to that a lot in my day to day work and I’m appreciative of working at a place that has that as their vision. In regard to my role at ABS, I actually think it’s probably pretty similar to an extension and outreach role. I do a lot of support for both our customers and our authorized representatives and sales force in the field. My training is in reproductive physiology. I try to blend that with genetics advice and try that interface between reproductive technology and getting the right genetics in the right people’s hands.

**Robin Salverson:**

Awesome. We’re thankful to have you and your knowledge and your expertise with us today on our Cattle HQ episode. For our listeners that are not familiar with “straws of semen,” or also called “units of semen,” a conventional straw which includes both the male and female sperm cells has approximately 20 to 40 million sperm cells within that straw. However, a “sexed semen straw,” or sometimes we also maybe hear it as “gender sorted straw,” has just male or female sperm cells. Could you describe that process of sorting the male from the female?

**Kenny Wells:**

Yes. I will start with one point of clarification there. It’s usually majority male or female. There’s typically a little bit of the undesired sex in there but the skew rate is usually up into the 90s in terms of towards the gender that we want, so that’s enough to get us a desired outcome. There are actually two technologies out there in the business today, ABS and one of their competitors. Our technology uses a process that we call “sperm cell ablation.” It’s based on the difference in DNA content between the X and Y chromosome in the sperm cells. There’s just a little bit more DNA in an X chromosome and so that cell is identifiable or that lets us tell the difference between them. It’s very complex and way over my head engineering-wise but basically we get those sperm cells lined up in a single-file line going through a micro chip and then use two lasers. The first laser identifies the sex of that sperm cell. The second one then ablates or destroys the undesired sex. Basically, what we’re left with a very high percentage of the desired either X or Y chromosome bearing sperm cells.

**Robin Salverson:**

What you’re saying is you actually are killing or ablating the sex that you don’t want. Is that correct?

**Kenny Wells:**

That’s correct. That’s correct. One point of clarification I might throw out there for anybody that uses this product is that we actually leave those destroyed sperm cells in the straw. If you were look at it under a microscope, you might notice a lot of, for a lack of a better word, junk in there. We’ve done that to avoid going through another step of manipulation on the sperm and sorting out those dead cells. They really have no negative impact on the final outcome of creating pregnancy.

**Robin Salverson:**

I had the opportunity when I was in graduate school to be working at Colorado State University with my master’s degree. That’s when the beginning if you want to say sexed semen started there at XY Inc. I know this is a different technology but they were at that time sorting male cells into one tube if you want to say that are unidentifiable ones into another tube and females into another tube. Does that technology still exists too? Is that the other technology that exists?

**Kenny Wells:**

Yes, that would be one of our competitors – technologies that’s out there. You did make a point there that I would go back to is that there’s a percentage of our sperm cells that are not identifiable as well. Those get ablated in our process as well to help make sure that we’ve got what we want in the straw at the end of the day.

**Robin Salverson:**

I think it’s important for our listeners to understand that process of sexing that semen because – I guess, the next question I have for you is there would be a difference, I would assume, between conventional straws of semen and sexed semen in regards to conception rates. Is that true?

**Kenny Wells:**

Yes, that is right. To your point, that’s largely because it’s a product that we got to manipulate some. This product gets manipulated post collection pre-freezing more than a conventional straw of semen. It’s logical that we’re going to see a little bit of a decrease in fertility there. We typically see in the range of what we would characterize as an 85% to 90% relative conception rate. For example, if a bull conventionally was expected to be 60% for his conception rate then we would probably expect his sex product to land in the low to mid 50s in terms of conception rate that you would see with that product. You know as well as anyone, different bulls have different conception rates and even throughout the year we see changes in bulls’ fertility-wise. In general, that’s probably the best way to characterize the difference in fertility.

**Robin Salverson:**

Also, with a straw of sexed semen now there’s also a different amount of actual sperm cells in that straw.

**Kenny Wells:**

That’s correct.

**Robin Salverson:**

Could you share what that looks like compared to a conventional straw? Like I said I mentioned 20 to 40 million sperm cells in a conventional.

**Kenny Wells:**

Yes. I think your 20 to 40 number probably is the initial packing rate and so we typically talk about ours in terms of post-thaw model sperm cells. Those ones that are actually alive after we get the unit thawed. Our minimum on a beef straw of semen is a target of at least 8 million post-thaw model sperm cells. For sexed semen, we’re in the 1.8 to 2.0 million sperm cells range. Obviously, there’s a difference there but we still very good results with a product like that and we wouldn’t – it doesn’t benefit anybody to put out a straw that’s significantly less fertile than a conventional straw.

**Robin Salverson:**

Absolutely. It’s going to go back to a reference that you made about your process and that there is a difference in the DNA content between the male and female, XX versus XY. It’s a joke amongst my friends that the reason that females are smarter is because we have more genetic matter. I’ve always [Laughter]…

**Kenny Wells:**

I won’t tell my wife and daughters that.

**Robin Salverson:**

[Laughter] It’s truly a running joke and I’ve always enjoy sharing that during AI school, so that kind of shuts some of the men up sometimes. I’m just joking. The use of sexed semen is very common in the dairy industry but it’s not very common in the beef industry. Could you maybe share some of those benefits of why people within the beef industry would want to consider using sexed semen? It makes sense in the dairy industry, we’re striving for those females. In the beef industry for some people it’s like I’m fine with self-steers and I keep some replacement heifers back.

**Kenny Wells:**

Yes. I think the dairy industry actually gives us a really extreme example of why you would want to do it in our business. That dairy cow is absolutely – she’s built to do a very maternal type of thing. She’s built to get pregnant and lactate and to do really nothing else. There are no traits. There is no terminal traits really built into those cattle. Sexed semen has let them focus on making those females in herds from their very best females and then do something different with the rest of their cow herd. That’s something worth contemplating for a lot of beef producers. Can you go down a path like that? I think it gives us an opportunity in the beef industry to make really focused genetic decisions around both maternal and terminal type matings. Where in the past maybe we’ve had to go down the middle of the road. The industry has done really well in that regard in terms of using what I would call maybe “dual purpose cattle,” cattle that do both maternal and terminal things well. Ultimately, we probably sacrifice a little bit on one side or the other in an equation like that. I think sexed semen gives us a tool to make a really focused maternal mating decision on a portion of our cows and then probably gives us an opportunity to do even better in terms of the marketable portion of our calf crop as well.

**Robin Salverson:**

That really leads really well into that program that ABS has initiated in the 60/40 program. I was curious if you would share what that program looks like and – especially how it could benefit those commercial cow/calf producers.

**Kenny Wells:**

Yes. I think 60/40 is what we see as our answer for commercial producers to implement sexed semen. Seed stock producers and – kind of more specialty niche type producers have figured out the value of sexed semen a while ago, but the commercial producers have been a little more reluctant to. A lot of the commercial cattle that we see AI and our business get bred off of Fixed-Time AI. The idea of 60/40 is really that there’s probably a minimum of 60% of cows in any Fixed-Time AI program that are good candidates to get a straw sexed semen. What we see with sexed semen is that there is a much better fertility rate or a better conception rate in cows that have express estrus at the time of Fixed-Time AI. It’s a pretty good bet that off of most sync protocols you’re going to be able to see a 60% response rate. 60/40 is really practically it’s implementing a Fixed-Time AI protocol, fitting those cows with some sort of estrus detection aid at the time of seeder removal. An estrus tech or tail paint or whatever your choice is there and then putting the sexed semen into females that have displayed estrus by the time of Fixed-Time AI. That can be either for the production of females or it can be to skew your calf crop to the male side as well. Just depending on the producer’s goals and targets and those kinds of things. I do think it works really well for the – in the scenario where we’re trying to make replacement females because I feel like we’re adding a few layers of reproductive selection intensity into that as well. Those cows that are in good body condition and longer post-partum at the time of AI are probably the ones that are going to respond well for us to a sync protocol like this. Putting semen from a maternally focused type of bull into a cow like that to make your replacement females, to me, seems like a really good bet, a smart decision from a long-term reproductive function standpoint.

**Robin Salverson:**

We know data shows too that the earlier we get a female bred and that heifer that calf earlier in that next calving season will stay in the herd longer if she is kept as a replacement female.

**Kenny Wells:**

That’s right, yes. There is that add on piece of this is if you actually end up keeping all your replacement females out of that Fixed-Time AI project you are breeding the very earliest born females out of that next calving season and there you go another – I talk about it like as a form of compounding interest almost, right? We just keep layering on these reproductive management concepts that we know work. It’s really a blueprint to build a really reproductive fleet efficient kind of a cow herd.

**Robin Salverson:**

Then that remaining 40% would be bred to a conventional straw of semen and that’s a 50/50 whether you get heifers or steers. Then they can go into our calves that we sell at weaning or bred counting or wherever your animals go from that point on.

**Kenny Wells:**

Yes, that’s right. It gives us some opportunities to do different things. The base scenario that we talked about is putting a straw of - terminally focused conventional straw of semen into those 40% of cows to, like you said, make a high value calf to be sold at weaning. I think there are scenarios where maybe a producer just wants to maximize the number of calves out of a particular bull and you can go back in with the same bull that you use in sexed semen if you just wanted to maximize the number of heifer calves you got out of a group of cows for instance. There’s a lot of different ways to apply it but we do feel the best option is probably to put conventional semen into those cows that haven’t shown estrus at the time of Fixed-Time AI.

**Robin Salverson:**

Because there should be a better response for conception rate too.

**Kenny Wells:**

That’s right. We see a better breed up in those females with that conventional straw of semen, yes.

**Robin Salverson:**

I was able to read an article that someone wrote up on the 60/40 program that you spoke on and then you said that another – a good reproductive management or – is you turn potentially - depending on the producer’s goal is to turn in a terminal bull for natural service. For instance, if they are trying to – with that last 40% of that herd you’re trying to make that a good calf crop weaning for instance for terminal heifer situation.

**Kenny Wells:**

Yes. To me the beautiful of the 60/40 is the ability to leverage some genetic extremes if you will. Make a really maternal low input highly efficient cow with that sexed semen on those front end matings and then if your 40% - if your goal is out of the rest of the calves to make a highly marketable set of feeders or a cattle that you’re going to retain ownership on, at that point your bull battery for clean up really needs to be pretty terminally focused to take full advantage of a program like 60/40. It actually gives you the freedom to do that if you’re not keeping replacement heifers back out of it. It does let us take maximum advantage of those kinds of extremes that we see today in the industry for genetics.

**Robin Salverson:**

It’s a value too to think about it. I was talking to a producer one day and he said, “I mainly run chars.” He runs Charolais but he has to keep a group of his cows back to be bred for replacements. Of course all of those or some are going to be steers if he’s doing a conventional straw of semen or natural service, it doesn’t matter. That group that he’s trying to make replacements from 50% on average are going to be steers. Then a portion of those heifers are not going to be kept as replacements. Then you get a lot of sorting going on and when you get to a cell barn or what not they start sorting these animals out and you no longer have load bots and you no longer – we know that animals that sell as load bots sell better than animals that you have 10 heads here, 15 heads here, 20 heads here. If you have 80 calves coming through that cell barn that all match or very similar that are – the terminal sires whether it’s chars or char crosses or whether they’re all black. He wasn’t seeing the financial benefit of keeping a small group of cows back to try to get replacements from, if that makes sense.

**Kenny Wells:**

Yes. No, I think that a scenario that’s custom fit to doing this. You can make a mating to make a replacement female that you really don’t want to a stir calf out of. You’re going to end up with a very small percentage of steers out of that mating but it’s a manageable number. Then you can be just as terminally focused on the rest as you want. The other thing that I would add there is what you pointed out is that I think there is a really great opportunity to implement cross breeding. You can build a cow that’s cross bred because we know there’s a real reproductive advantage, longevity advantage to those cross bred cows. You can use something completely different as a terminal solution if that’s the path you want to go down with this and so Charolais being one really good option there. There’s a lot of potential and a lot of flexibility in the way people can implement a program like this.

**Robin Salverson:**

Adaptivity is the keyword.

**Kenny Wells:**

Yes.

**Robin Salverson:**

Making it work for yourself and your goals and your operation. ABS actually worked with cooperating herd out of Montana with the 60/40 program. Could you share some of those results from that on-ranch study that you guys did?

**Kenny Wells:**

Yes. We worked with a ranch called the Bair Ranch in Martinsdale, Montana. They’re actually owned by a foundation and so they’re a non-profit. They run about 900 cows in a given year. We had the opportunity to work with them for – going on five years now to run a demonstration project of the 60/40 concept. There we were really looking at making replacement females and so we used female sexed semen and – there’s probably three big observations that we got out of that. The first is was a validation of that relative conception rate because we did split the cows and do a comparison between using just conventional semen and then doing the 60/40. That validated that relative conception rate that I gave you to begin the discussion here. The second part was, “Could we make them enough replacement females with the 60% of them being bred the female sexed semen?” Through the first four years of calving those cattle out we’ve made more – we have exceeded their target for a number of replacement females needed out of a calf crop with just the sexed semen straws there. The third thing that I would say is that in retrospect we didn’t really spread out the calving season. Now we have already talked that we’re going to see a smaller – a small decrease in fertility. We’re not going to get as many cows bred on the first day of the calving season but what we saw is that by 42 days, two cycles later, essentially the same proportions of the herds were bred up. There wasn’t really an obvious negative consequence of implementing the 60/40 which is reassuring as well. I think part of that is just to go back to basic reproductive management is that that fixed-time AI is such a powerful management tool. Giving all those cows a shot to get bred the first day of the breeding season gets you such a head start on getting cows bred and calved out early that I think the slight decrease that we see in conception rate with sexed semen doesn’t really have a major negative consequence in the overall breed up.

**Robin Salverson:**

You mentioned too that this particular ranch had more females than they really needed to replace their heifers or start with replacements. I think that’s another avenue for individuals that if they do have some additional heifers that are high quality that they could start selling them, have another enterprise potentially as really great replacement heifer calves going into somebody else’s operation.

**Kenny Wells:**

Yes, that’s right. It also gives people maybe an opportunity to look at this number and say, “Maybe I don’t need” – if you’re really good your cows are not turning over fast maybe you don’t need to breed 60% of the cows with female sexed semen. Maybe 50% is a better target. Maybe that gives you an opportunity to put some male sexed terminal semen into a group of cows as well and start to skew that marketable portion of your calf crop towards the male side of the equation.

**Robin Salverson:**

There’s a lot of opportunities. When I read this article that was written up I was like, “This is a really – a very easy program to think about,” to tell you the truth if you’ve done any – like you’ve said any AI used-timed insemination 60/40 makes a lot of sense. There’s a lot of adaptability to the goals that producers – whatever goals those producers have. You mentioned a little bit ago you won’t maximize AI pregnancy rates with the use of sexed semen and the 60/40 program but those cow/calf producers will gain a lot more. You don’t see any negative impacts or effects, so in regards to that.

**Kenny Wells:**

I’ll be honest that maybe early in my role at ABS I wasn’t always a big proponent of sexed semen but when see it implemented, the value of making the right calf from each and every mating that you make is really impactful. Just making a set of replacement females out of exactly the cows you want them out of is a powerful tool. The ability then to really push the limits on terminal value on the rest of the calf crop becomes a valuable piece as well. I always tell people in customer meetings, I think folks like myself and – I don’t want to put words in your mouth but we spend a lot of time talking about trying to maximize conception rates in an AI program. I think that is actually probably been a bit of road block to the implementation of sexed semen by a lot of folks because they have a hard time getting around the idea that maybe we’re going to take a step back for conception rates. I do think there’s a lot of power in making the right calf from every mating with a product like this.

**Robin Salverson:**

Absolutely. I say that a lot too just like you, Kenny. When sexed semen first came out and when it was starting to be integrated within ABS, the sires - the company, a lot of beef bulls were not sorted. Has that changed now? Is there a lot more bulls in your line up for instance that commercial cow/calf producers can look at that sire catalogue and say, “I like him, can I get sexed semen on him?”

**Kenny Wells:**

Yes. Yes, I would tell you that our availability of bulls of sort of on the – from clear across the genetic spectrum across multiple breeds is as good today as it has ever been. There still are bulls occasionally that don’t work on the technology. They, for whatever reason, don’t work but we – the industry has gotten better and better with the technology. It keeps improving and so that it opened the door to a broader spectrum of bulls. For us having our own technology in house has given us a little bit more freedom to sex product on a wider spectrum of bulls as well. I think we would be hard-pressed to find a producer that we couldn’t find a bull that fit them in the form of sexed semen today. Even if there’s a bull that a person wanted that wasn’t sexed it’s not necessarily off the table that we couldn’t make that product as well.

**Robin Salverson:**

You get a lot of the data back and how your bulls have done out in the field, out in the ranch, right?

**Kenny Wells:**

Yes.

**Robin Salverson:**

Do you get that also with sexed semen? Or do you guys do some in house type of research with the bulls that you collect and sorted to see what their conception rates are? As you said, “Some bulls just don’t sort well.” Do you do your own research to verify that or do you do more on-ranch type?

**Kenny Wells:**

Yes. We do our best to try to get some field data on these bulls. Sexed semen is a growing portion of what we sell. It is a smaller piece of the overall sales units. To say that we have a tremendous volume of sexed semen fertility data is probably not right but we do try to get that where we can. We probably have better data on the dairy side of our business on that product as well. We continue to watch that and to monitor that fertility there just in case there’s any issue but I think - always trying to make sure the process is improving.

**Robin Salverson:**

It’s important for our listeners to understand too that unfortunately at this time and a lot of research has been done we cannot look under a microscope and say, “That is a highly fertile semen.” It’s just not there.

**Kenny Wells:**

Yes. We do a host of quality control things ahead of time. We do, obviously, all the standard semen morphology things that we can. We do everything we can ahead of time to make sure that we’re putting up a really good product. To your point, there are things that influence fertility that you just can’t see under a microscope. There is a bit of risk there but by and large we’re putting up – the industry does a good job of putting up a good product and making pregnancies for people.

**Robin Salverson:**

I totally agree. The industry does put out very good products. You guys have to follow a very strict regimen of doing pre-thaw - or not pre-thaw, excuse me. Before you freeze you have to evaluate. Then you freeze and then you have to do a post-thaw evaluation before it ever leaves your facility, right? Am I expressing that correctly?

**Kenny Wells:**

Today, it’s really we use a system, a CASA system which is all a computerized system of tracking sperm cells which is really pretty amazing if you ever get to see the – get the opportunity to see something like that versus historically a lot of that was done by a trained person under a microscope. There, again, another example of continuously improving the process of trying to put up a really good product. Like I said, “It does none of us any good to put out something that won’t get cows pregnant.” We do our very best to make sure what goes out the door is going to do that.

**Robin Salverson:**

Absolutely. We are going to be winding down this episode of the Cattle HQ podcast. Are there any additional last thoughts that you have, Kenny, before we sign off?

**Kenny Wells:**

I would encourage everybody out there to take a minute and think about whether sexed semen fits into your operation. It doesn’t just have to be for making replacement females. I think we see a lot of seed stock producers who are thinking about creative ways to make more bulls, for example, out of a fixed set of cows and resources. Sexed semen is a really interesting tool to make the most of your most valuable product from your farm and ranch. It may not to be a fit for everybody but it’s definitely worth giving it some consideration.

**Robin Salverson:**

Thank you, Kenny, for those last thoughts. Thank you for joining us on this episode of Cattle HQ.

**Kenny Wells:**

Thanks for having me today.

**Robin Salverson:**

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, we are as rich as the last person we helped.

**Kiernan Brandt:**

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[Outro music]