## Silage

## Season 1, Episode 2

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**Olivia Amundson:** Welcome to the second episode of cattle HQ brought to you by South Dakota State University Extension.

I am Olivia Amundson, a cow calf field specialist based out of the Sioux Falls regional office. Today we're going to be discussing silage and some of the management considerations when putting up a successful silage crop with Dr. Warren Rusche.

I'm also joined today by my co-worker Kiernan Brandt, Kiernan, would you like to give a quick introduction?

**Kiernan Brandt**: Hello, everyone out there. My name is Kiernan Brandt. I'm the other, one of the other cow calf field specialists. I'm based out of the Watertown office joining you today over zoom from the southeast Research Farm and beautiful Beresford South Dakota.

**Olivia Amundson:** Yeah, thanks, Kiernan. And I suppose I should have probably said where I am based out of so I'm based out of the Sioux Falls regional center. But I am up here in Brookings today talking to Dr. Warren Rusche. Why don't you just want to give us a quick introduction of who you are and kind of what you do.

**Dr. Warren Rusche:** Sure, Olivia, like I said, I'm an extension feedlot specialist. I work with cattle feeders and backgrounders across South Dakota, helping them come up with ways to more efficiently use homegrown or purchase feeds, be more sustainable and ultimately make more money. Now my background I've been doing in some capacity, I've been working in feedlot extension for the last five years. Prior to that I spent five years as a cow/calf field specialists, and there's about another dozen or so years in production Ag working on our family's cow calf and customer backgrounding.

**Olivia Amundson:** Absolutely. Thanks, Warren, and the doctor is new, isn't it? We need to address that. And…

**Dr. Warren Rusche:** You know, that's, Yeah, I completed my PhD program in April and I, I started my new role as Assistant Professor Extension Feedlot Specialist Monday, August 23. So this is this is new, but the comfort level starting increasing a bit.

**Olivia Amunsdon:** Yeah, absolutely. And we're excited to have you in this position Warren, because you're really a wealth of knowledge. And so, you know, you're still my mentor, even though you're feedlot related. So, so Warren, we're just going to kind of start this out fairly simple, but kind of, you know, tell us a little bit about what we need to know about silage, you know, in terms of, you know, how do we know when silage is ready, what kind of moisture does our silage need to be at kind of thinking about packing and ensiling and that kind of information?

**Dr. Warren Rusche**: Sure. This is such an important topic for us in South Dakota, especially in the areas where corn and cattle production overlap. Corn silage is really a cornerstone ingredients, whether we're talking on the cow calf or the backgrounding and finishing standpoint, gives us a lot of that harvest method gives us a lot of different options as far as how we can utilize the feed stuff and can really be a great way to add value to home raised feeds, when it's done correctly. If it's not done correctly, our spoilage losses can increase to levels that really where the inefficiencies start to add up to the point that the silage doesn't make much sense. So we're going to talk about some of the ways that I can recommend to people that in order to do silage correctly, and the first of the things you talked about, or in that list of factors is harvest moisture. The ideal is somewhere around 65%, moisture 35% dry matter, you know that that's kind of the sweet spot. And we'll talk a little bit about what happens when we're on either side of that. The place I don't want to be is I don't want to be too early, if something were more than 70% moisture. And the reason for that is, when we're that wet, we start having things like clostridial fermentation, excess butyrate produced in the silage mass, I'm getting into a lot of biochemistry that our listeners may or may not be all that concerned with. But ultimately what it really means from a practical point of view is when we're too early, we have too much run off loss piles running too much. We have some sour smelling silage the cattle don’t want to eat as well. It also can set us up for things like clostridial storms where we have increased risk of bloat loss and so forth. So we don't want to be too early. And that can be a challenge when we're dealing with things like drought stress corn, because that crop is often wetter than we think it is just looking down the road.

**Olivia Amundson:** So just as a reference, what can guys do to check the moisture of their corn?

**Dr. Warren Rusche**: Yup, the, the most accurate way regardless of growing conditions is to actually do a for real moisture determination. Whether we run this through a wood chipper or chop things up and whether we use the microwave method or the coaster or people use food dehydrators. You know, there's lots of different ways to do that. But that's the most accurate way of determining what, what we are truly dealing with from a moisture standpoint.

**Olivia Amundson:** And I guess, where to guys find information on that if they were interested in, let's say, doing a microwave test.

**Warren Rusche:** If you weren't on our website extension at extension.sdstate.edu, we have some information on that. And frankly, if you were to Google, on farm silage moisture determination, you can find that and you know, if the, the microwave method works, sometimes it's a little more cumbersome because you're doing it repeated steps. And you don't want to do this with a good microwave in the house. Ah, if someone’s set up thinking we're going to be doing lots of these, you know, the, the coaster moisture testers work really well, again, invest a few 100 bucks in those in order to do that, but it's a tool that works. You know, there are some input suppliers, though that will offer this as a service. And they have a wood chipper, you chop off the plants will run it through, they'll run it through their equipment and tell you in fairly short order just how wet it is. So once and what a lot of people that use as a rule of thumb is, when we're at, let's say, somewhere around 70 to 68% moisture, it's time to start with the understanding that they will get drier as we go. Because the flip side of this, of that range of let's say that's kind of that ideal, that sweet spot is somewhere between 60 and 70% moisture. There's been some more work on taking harvest later. And we've done some of that the South East farm, where we delayed harvest intentionally to evaluate drier corn silage certainly can work. One of the advantages of delaying harvests is I get greater starch accumulation. Basically that kernel keeps putting starch down so you're increasing the energy content in silage. The downside is it becomes harder to pack. And I know we're going to talk about that in a little more in a little more detail later. But as that dries down, it just it gets fluffier and harder to harder to handle harder to get the real good pack and get the density we need in order to exclude oxygen. So this, that whole process of putting up silage correctly starts with getting the moisture content right.

**Olivia Amundson:** So have you ever heard of the milk line test?

**Dr. Warren Rusche:** Yep, and that's a good way to, you know, it's kind of a visual indicator of when we want to start, you know, the, the guideline is generally somewhere around half, there's a break break open the cob, and the fingernail or something sharp you go down from the top of the kernel towards the tip. And, you know, you find that point where they're at start where the milk line, you know, and it's somewhere usually, if it's about half milk line, then we're about on target terms of that 65%, moisture 35 dry matter. More recently, people you know, as we talked about with the starch accumulation, people are starting to push that a little lower in the plant, you know, even approaching dry lag, black layer at times, because, you know, depending on what we're feeding, and what our objectives are, we're gonna capture more energy per acre by doing that. But the milk line is a way to visually get an assessment, it's more reliable than just looking at color. As we've changed corn genetics, these hybrids stay green longer. That's the name of the trade I think is Stay Green. And so you can’t always, so in a good year, as I mentioned earlier than a drought year crop is wetter than a person thinks. In a good year its often drier than we think that even though it looks still looks green, that's actually drying down faster than we think it might be. The other rule of thumb that is often used and at least the one time we've done that study seem to hold that, that under normal conditions, crop plant, dry matter content will increase by half a point per day. So if we're if you’re going to chop silage over four days, you might expect that it gets two points drier, maybe it goes from a 35 to a 37 over the period that you're chopping silage. So that's one thing to keep in mind, as we're starting to try to schedule the schedule operations or, you know, if you pulled some samples, maybe did a little test job and it's at 70% moisture. You know, we needed, we want to maybe our goal was we're gonna start at 65 that's, that's 10 days away and half a point per day.

**Olivia Amundson**: Sure, so if are, if we have a lot of silage to chop in general and we are using that milk line method. Is it safe to say that if we if we look at that kernel of corn and that milk line is a little higher than middle and we need to get that corn chopped, that may be a good time to start, or are we kind of shooting ourselves in the foot by going on.

**Dr. Warren Rusche**: It's something like a quarter or a third, it's probably time to, let's be getting ready. And let's start, ideally, let's take some field samples and see where we're at, because it's getting close.

**Olivia Amundson:** Okay.

**Dr. Warren Rusche:** You know, and sometimes that, you know, that transition from too early to just on time too late, again, can be awfully short so and you know, and then there's field variation to deal with to, you know, what, what you can tell from an end of a field or in a few rows, it might be considerably different when you get out in the middle of an 80 or 160 acre field. So that was, I would look at that, you know, that maybe quarter third milk line is kind of the time point to start getting ready. And with the idea that, then we're might be able to hit that target pretty closely. And one challenge too, is we have a lot of operations, we're relying on custom operators. So we need to, you know, we need to be communicating with those folks as to what our plans are, what is their schedule look like? And you know, what we're seeing on our own operations as far as moisture content and maturity.

**Olivia Amundson:** And I think that'll lead us into the next question I know we were going to talk about ensiling and things like that, but we can come back to that. So you said a lot of these guys work with custom choppers and things like that. And sometimes we have to kind of just deal with the cards that are dealt us and understand that our corn may be ready, but we're not going to have it chopped directly at that time. So what are some things that cow calf guys can think about? If they maybe do have to wait a week out before that time is getting checked?

**Warren Rusche**: Well, one thing and you know, if we step back, and, you know, let's think about I'm going to shift gears and think about next year, just a little bit, just here, this year is fairly well cooked, cooked in the books. But for another year, to hedge our bets a little bit, you know, we could talk to our seed corn genetic supplier, about planting some ranges of maturity, not necessarily with the idea that this is my field of silage corn, but that I have multiple places that could work depending on when, how the growing season goes. And when we can find, find when the crews are available. So that ideally we've got something that's in the ideal window. That said that's now we'll jump back to this year, and we've got corn is drying down fast. And custom cutters going to be a little while. If we're going into a bunker or excuse me into a bag or an upright silo, adding water at that point could be feasible as a way to increase moisture content. It's not feasible if we're dealing with a try to put up a pile of drive over a pile filled bunker. In most cases, the equipment is so, so large that so many tons per hour, throwing up a pile with the ability to uniformly incorporate water just really isn't practical. What we can do and as I said earlier, when it's dry, we have trouble packing. One way to get around that is to chop it finer and/or use kind of processing. Basically what that does is reduces the particle size, lets us drive out more oxygen. And because oxygen is really the enemy of this is we need to aerobic fermentation is not doesn't leave us with the same quality I guess product with same quality of feed as anaerobic fermentation does, an anaerobic or aerobic fermentation doesn't stop until we get rid of the oxygen. So the more we can exclude when we're filling, the more quickly we can get to anaerobic fermentation, the more rapidly we get lactic acid and a pH drop to preserve the product. So one of the things we can do if if it's a little too dry and too fluffy is we can reduce the chop length. Because that will pack easier sort of like the difference between packing big packing peanuts versus a little fine things. The downside of that is it takes longer, the operators have to slow down, which generally makes you slightly unpopular, from a grower standpoint, communicate our customer harvester. What I would say in that situation, though, is you know, for the grower or for the person who is paying the bill to have the crop harvested, you're paying the bill, you have to live with the feed quality from this. If that's what we need to do in order to make better quality feed, that's probably what you have to do, might cost you a little more, perhaps. But that is that's the only thing that ends up preserving nutrient value better than leaving cut really long. That's the approach I would take. If you're thinking about feeding that those shorter, finer Cut particles, depending on what else is going in the diet, that may be a concern from an effective fiber standpoint. That's one of the reasons why, you know, what I just said is probably heresy in the dairy world, because they want longer particle length in terms of rumen health. If I put my cow calf producer hat on, if I'm feeding silage, with something like ground straw, or corn stalks, ground, hay, I'm not too worried about effective fiber, we're going to have something that's long enough, the rumen else will be fine. Same is true, the backgrounding phase in the in the finishing part of the feedlot, perhaps we need to be more concerned about particle size, but you know, I am, but even in those cases, I would rather take some chances, and maybe have to include some ground straw to get some more effective fiber than run the risk of having beat stuff that just doesn't permit well.

**Olivia Amundson:** Yeah, I think that's a lot of really good information. And, honestly, full disclosure for our audience. You know, Warren had asked Kiernan and I this same question last week, and I told him a guy should just really buy a chopper and then they wouldn't have that issue. But that was not the answer he was looking for. So, so I uh…

**Warren Rusche**: So it becomes a capital problem too. You look at some of these large capacity choppers, you know, you're looking at a million dollar investment or more, it's only going to use a couple days.

**Olivia Amundson:** Yeah, absolutely.

**Warren Rusche:** But you're right or, or we take out the old pole type out of the trees. But again, the problems come into we’ll have some of the same issues, because with that size equipment, our harvest period gets longer. So now if we still have to think about doing some different chop lengths, the part we hadn't talked about much yet is just packing in general. One of the things that we've kind of touched on it here is that our capacity has greatly changed from what it was even 10 or 20 years ago, in terms of how many times we can harvest per hour, we haven't always been as good at keeping up with that increased harvest capacity, with the capacity and the weight of the pack and tractors that are working on the drive over piles of the bunker at our Sarah and Kiernan’s forage field days, a few weeks ago, the rule of thumb that if I remember correctly from Dr. Brook was 800 pounds of tractor weight per ton of feed delivered per hour. So you can look up what you know what your four wheel drive tractor weighs. But in a lot of cases, you know, having one more tractor might really help. One of the things I thought was interesting that thinking back to our place that we maybe didn't always do as good a job and was that the packing occurs while you're pushing feed up when working that wedge, it’s not taking the tractor driving an extra 20 minutes over the top, just drive over everything. If that makes the person feel like they're doing something, buy you're really not doing anything to change the density, you know, 12 foot high pile, you're not doing anything below about six inches. So what you need to do is you need to invest the time and effort while you're pushing feed up that we're working that pile face over. So we're increasing density that way, rather than trying to do things over the top, personally.

**Olivia Amundson:** Absolutely. So what would your, what are your thoughts or opinions on covering a pile?

**Warren Rusche:** Absolutely critical. If you're not covering the pile, you're giving up another 20% of your crop production. There is I can't put it any simpler than that. You know, and we've got the data to prove it there. We know that you're going to lose a certain amount of organic matter in silage simply due to natural biochemical processes, you know, there's gonna be a certain amount of shrink loss, we try to keep that it can do everything really well, we can keep that in the single digits percentages from let's say 10% is kind of the goal. But if we don't cover the pile, that 10% loss that is just kind of standard that is just that's the cost of doing silage. That loss can get increased to 20 or 30% very quickly. It's not just the black spoilage layer you see on top. It's one you got to think about Yeah, that's spoiled silage might have been two foot originally. You also have to consider how much organic matters lost below that spoiled layer. You know that you don't necessarily see. And the really insidious part of it is it's not things like we don't lose lignin or, indigestible fiber we use things like sugars and organic acids and components that the rumen animal can use for energy. So all of that discussion we've talked about, about harvest moisture, particle length, you know, inoculants. If you're not covering the pile, none of that makes a whole lot of difference. So yeah, and I get it. I said, in the intro, I did this for 13 years, and I was always the youngest person on the pile, and every single tire was always full of water, and it was the nastiest, worst job of the year. But it probably was the one that paid our family more than any single thing we did. The other 365 days, we probably save 200 tons of mileage every year by doing that, ugh and in today's market that 200 tons of silent is worth about $10,000 not many jobs I can think what three or four people can make 10 grand in the morning.

**Olivia Amundson:** Absolutely. So it essentially pays for itself.

**Warren Rusche:** Absolutely. It pays. And then some so, you know, if you gotta go go uptown and find the high school football team and every kid gets 100 bucks. Yeah, do it. If you don't do that, you pay for the feed twice. You paid for it, you paid to grow it, and then you get to pay to buy it back because you don't have as much defeat is what you harvest as…

**Olivia Amundson:** Absolutely. Well Warren, that's really all the questions relating to silage that I had. Kiernan, do you have anything that you'd like to add, before we wrap this up?

**Kiernan Brandt:** Well, you know, I just thought that was really great point that Warren just made about trying to really maximize the, maximize what we're doing in terms of our storage stability. And I mean, in a year like this, where a majority of the counties have already been designated for advanced drought situations, I mean, maximize and every, every bit of yield we can get out of that corn crop is, is going to pay dividends to us in the long run and protecting our margins every bit that we can. Warren, if we could backtrack a little bit, I'd love to hear your thoughts on inoculants, just in terms of maybe even what what at a 10,000 foot level is an inoculant doing? How is it efficient? Are there different options out there for guys, if we're ever doing the things that we should be doing in putting our silage up right.

**Warren Rusche**: From a big picture standpoint, I look at inoculants as an insurance policy, we're adding some additional bacterial strains to make certain that we're exerting a little more control over the fermentation products process by introducing bacteria that we want to have be active rather than relying what might be there naturally. Kind of full disclosure, our family didn't inoculate silage and I would say the feed we fed was fine. But after seeing more of the data and talking to more the folks out there, I think it certainly has some value, especially when conditions may be varying a bit from ideal. So I think that inoculant phase look inoculant usage is something I would recommend doing. Having said that, you know, we want to make sure we're doing that correctly, also. It's a, we're dealing with live bacteria, so we want to make sure we're doing all of those things correctly in terms of application. You know, and going back to the earlier comment, you know, if we're not covering the pile, I wouldn't spend any money on inoculants, I mean why. You're, you're inoculating 20-30% of the silage mass, that you're not going to see much value from. So I, you know, I think it's certainly has a place it's not a crutch. It's not a cure all. If we're not correct, and some of these other areas, adding inoculant is not going to magically make junk into good feed.

**Kiernan Brandt**: Right. Great point. Well, I guess along those lines, you talked about it a little bit earlier, but I guess maybe if you could speak a little bit more just to how, how important is it for guys to be going the extra mile when in terms of kernel processing, whether, whether they're running a kernel process, or whether they're just monitoring that through their chop length, to once they've let that corn go through that maturation process to get as much starch in there? What can they be doing during processing, to making the majority of that starch available for you for utilization when it’s being ensiled.

**Warren Rusche:** I'm going to tell you, we've done a little work in this and I'll tell you what our results were and then I'll you know give you kind of the some of the the footnotes and fine print as to whether or not how well that applies to every situation. I'd mentioned earlier we have we fed some cattle later harvested silage. We said that at about 15% of the diet, to some finishing steers, we found no differences between the harvest timing on any of the performance measures in terms of feed efficiency or gain. We also did kernel processing on that with you know on both different harvest dates. And again, we saw no differences to kernal processing. So in that situation With big yearling cattle feeding on low amount of silage, you know, mostly it's as a roughage source with a little bit of grain, we didn't see any difference that would actually pay for the kernel processing. Now, that said, we're putting this in bags. You know that later harvested crop got a little fluffy. Perhaps, if we did kernel process, we could have maybe been able to pack that more densely and maybe improve some aerobic stability. It didn't show up, we did think that it did get heated little bit all the silage did when we opened up the face, but it didn't hurt her performance. We were also only feeding a small portion of silage, 15% silage, that on a diet for those cattle is not a lot. If we'd have been feeding this at something like 40 some percent to a group of growing cattle, maybe those, maybe we would have seen some differences in performance due to starch availability, we just don't know. The other part of that equation that sometimes comes into play is, I think one of the reasons why kernel processing there's two reasons why I think kernel processes are popular. Part of it comes from the dairy industry, where when they've done it, they'll see a small difference in milk production, that we just don't observe in terms of feedlot cattle performance. The other part and why I think some people advocate for kernel processing is that process will bust up those disks corncobs. And then you don't see those accumulate in the bunk. And no one gets mad at their nutritionist, or consultant. And he also don't see as many whole kernel part, kernel particles passing through the manure. And again, people then don't get mad at their nutritionist and their consultant, the group of cattle that I was talking about that we were feeding, these were big, high performance, cattle, they ate a lot, they gained a lot, they got big, we never got out ahead of them in terms of feed intake, you know, they close out at something over 30 pounds of dry matter. They didn't leave the thing behind, we did so we never saw that differences in any kind of bunk refusals from those chunks of cob. You know, if we were feeding some lower intake cattle, where we're, you know, intake might be an issue, then we may have seen some differences in feed refusals and sorting that in our experiment we didn't see. So for me, the bottom line is going to be how much does kernel processing add to my cost of feed? What am I feeding this product to? If I'm feeding it the cows, I'm not sure there's enough performance difference to pay the extra charge, If the harvest moisture is pretty close to target, I don't know if we're going to have any real differences in our ability to pack. If I'm beating this to the low inclusion to some finishing cattle, there may not be enough differences, either. So I'm, I'm given the extension answer a little bit. I know it does that it depends. But based on our observations, I think, I don't think that case is it to me, it's not a slam dunk, you have to do this. And I know that's not always what messages being sent out in the industry. But that's what our data and data from some other places show is that we don't necessarily have to kernel process silage or to make a good product.

**Kiernan Brandt:** Sure. Is there any, uh, just wrapping up here any general guidelines of yours or any rule of thumb that you like to use for maybe novice cattle that haven't been fed silage in the past, just in terms of inclusion rate or utilization getting started?

**Warren Rusche**: You know, the only class of cattle I would really be concerned about might be started calves that perhaps, you know, coming from places where they're not going to see a lot of harvested feed. So I wouldn't incorporate any silage probably for the first few days. And then I would just do it in small amounts and then watch it and take the other part of that that we had really talked about but the what there's a limited amount of data but it's very convincing that feeding spoiled silage to cattle does not work. They don't want to eat it. They don't digest it, they don't perform on it. So anytime when we're talking about especially things for thinking about feeding calves haven't seen silage we need to make sure this is good stuff and not a bunch of slimy spoiled junk.

**Kiernan Brandt:** Right. Well along those lines. I've been getting some questions lately about guys feeding, feeding green chop any concerns there when we're when we're out cutting silage and feeding it right away?

**Warren Rusche:** The first concern I have with that is usually people are thinking about doing green chop when they're short on other feeds. And usually when we're short on other feeds a lot of times because we're dry, green chop can work then then a concern when we're dealing with drought is nitrates. If the nitrate concentrations are low green chop works fine. If they're not, we have no one of the things we count on and why silage works so well is that in the ensiling process, the nitrates get really kind of used up, basically we cut the amount of nitrates in the field in the silage by a third to a half. From the time it goes from the pile to when we open it up, we won't get any of that reduction for feeding night, for feeding green chop. And in fact, if we're not able to keep that fed up quickly, like on a daily basis, as that feed heats up some of the nitrate converts to nitrate. And that's about 10 times more toxic than nitrate is. So we might actually make the problem worse rather than better if we got high levels to begin with. And we're trying to chop a couple days worth to feed as green chop. So the short answer is, yeah, it can be done. We got a cup, we need to be concerned about nitrates, we need to be concerned we need to make sure we're not getting out ahead of ourselves in chopping more than we can use up in a short period of time.

**Kiernan Brandt**: Sure, great answers well I know a lot of people have been concerned with with nitrates this year, but and we really take the opportunity to plug our nitrate quick test at every opportunity. But for any listeners out there that are interested in getting getting nitrate test on any of the South Dakota State University regional extension centers have those available that they can run on standing or harvested forages.

**Warren Rusche:** If someone's looking at doing green shop, I would not rely solely on that quick test unless it comes back negative because the issue is now we we know there's some there, but I don't know how much. And if we're going to feed it directly, I really need to know the number. So in those cases, then we need to find a lab and get some kind of measure. Kind of as you know, just as an anecdote, they looked at the field a couple days ago that every field showed some nitrate two of them were down around four or 501 was around 1100 or 1200. So in that case, two feet and this person is looking into a green shop, that case a couple fields were going to be pretty good candidates, the third field might want to think about just diverting those acres over to silage production. So from that standpoint, you know, as we started to think about doing some things like green shop, depending on how much stress that plants under having the actual number is going to tell us more of a story. The quick test is a quick screen to say whether or not we get a need to get it tested. But it's not going to give us enough information to really be able to say what's safe, what might be some your riskier option.

**Kiernan Brandt:** Right, right. Absolutely. Yeah, I think the more that we can do to just make sure and quantify the amount of nitrates we're doing is just going to give us a lot a lot better ability to hit him hit and use that feed rather than just condemn it or have to do something drastic that makes it unavailable and not not usable at all. I mean, that's a great instance right there that you just described of some that could potentially be fed as green chop if it was done right and in a timely fashion. But then again, if they sat and some of those nitrates converted over to nitrate that could potentially become toxic, pretty quick. So really speaks to the importance of of being able to quantify what you're feeding and hone in on on some of these landmarks to do it safely and efficiently. Anything else you'd like to cover with us Warren?

**Warren Rusche:** No, I think we've, you know we've really kind of covered, I think the high points of how to effectively use silage, you know, I can hit on the that's kind of those main themes is get it harvest at the right time, get it put up correctly, and pack the right density, use inoculants as appropriate, where were we as an insurance and then cover the pile. And if we do all those things, then we should have a really versatile feed stuff that will fit into lots of different cattle diets very, very effectively.

**Olivia Amundson:** Yeah, thanks, Warren for that, that wrap up and the dialogue today. We really appreciate this information on silage.

That wraps up today's episode on silage. Once again, this has been cattle HQ brought to you by SDSU extension. Visit extension.sdstate.edu for the latest beef information. We'll see you next time

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