## Blooming Prairies: Embracing Plant Diversity: Keeley Wheeler and RaeAnn Powers

## Season 1, Episode 42

[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.

**Madison Kovarna:**

Welcome to Cattle HQ, brought to you by South Dakota State University Extension. I am Madison Kovarna, a beef nutrition field specialist based out of Watertown. Joining me on this episode is Kaylee Wheeler. Kaylee is a range field specialist with SDSU Extension and has a deep passion for South Dakota range land and grazing livestock systems. She is based out of our peer regional center. I am also pleased to share that we are joined by Rae Powers by the Xerces Society. Rae has a deep passion for working with landowners to create pollinator habitats and focuses on the function and diversity of mixed grass berries. Rae covers the bulk of Nebraska and South Dakota for the Xerces Society. Both Kaylee and Rae are joining me today to discuss some information about the importance of native plants and results from native plant research they have both played roles in. This kind of plays off of our episode` two weeks ago or however long ago that was. This plays off of that episode here and we’re kind of diving into maybe some other work that other companies have done, other organizations have done in this space. Kaylee was on that episode previously to discuss the SDSU Native Forbs Research Project. Rae, would you want to shed some light on some previous work that the Xerces Society has helped with or conducted and give a brief introduction for our listeners?

**Rae Powers:**

 Yes, great. [Laughter] Thanks for having us, Madison. It’s so nice to be here. So starting in about 2019 and 2020 the Xerces Society staff in the Great Plains and we’re all in partner positions with NRCS, so the Natural Resources Conversation Services. We’ve been working on sort of very broad guidelines for rangeland management for pollinators. So sort of the things you want to think about on rangeland that are inclusive of pollinator health. One thing that’s pretty common in the Great Plains rangelands that’s really disappointing for us who love wildlife and plant is sort of broadcast aerial sprays of broadleaf herbicides. So to counter some of those sprays, we really thought, “Let’s include some data on the forage value of wildflowers” so we can communicate to our ranchers that these plants have value for your livestock. So we went looking for that data [Laughter] and there was some scattered, really small data sets that we could find. Of course, you’d see anecdotally things included in range documents or plant guides that said highly palatable or high protein but there really wasn’t kind of a full picture of what these plants were providing and it certainly wasn’t inclusive of many of the plants that we see quite abundantly on rangelands, wildflowers in particular. So with funding from NRCS and specifically North Dakota NRCS and in partnership with North Dakota State University in 2021, we started collecting samples from across the northern and central Great Plains of plants. This took a lot of lead [Laughter] time honestly. We spent a lot of time thinking about which wildflowers to include and conversing with experts and we looked at, I think, it’s National Range Inventory Data, NRI Data, to make sure what we were thinking were common and abundant rangeland wildflowers were in fact found pretty abundantly on these landscapes. We worked with range experts to at least anecdotally hear about the palatability of these plants. “Is this something you think cattle have been eating? Have you seen them eating or you suspect their eating?” and kind of a final piece of selecting our plant list was are they useful for pollinators. So we wanted wildflowers primarily but a lot of the plants that we chose are pretty big hitters when it comes to supporting a wide array of pollinators and other insects. So the first year was sort of a trial year [Laughter] and we had no concept of north to south, so that would be Nebraska to North Dakota or east to west within those states if these data would vary at all. So we just sort of scattershot across a few states and tried to systematically get sort of central east-west in each of the Dakotas and Nebraska. Kind of early 2022 when those samples were rolling back in and we were starting to look at some actual data, it seemed that at least when it came to forage quality, so kind of the crude protein and the total digestible nutrients, that north to south didn’t look like it had much impact and the east to west also wasn’t huge. So 2022 and 2023, we just kind of went for [Laughter] it and we got a much broader array of plants and samples. We were also looking across the lifecycle of these plants. So early, when they’re vegetative, pre-flowering, flowering, and then post-flowering. So we ended up with about around a thousand samples of about 75 species and we did broaden the geography a little bit too. So were collecting samples from about 10 states, all kind of surrounding those Nebraska and Dakotas area. So it’s a complex data set and it’s not always systematic. In North Dakota we had crews and staff going out. So we got a pretty solid data set from three sites across the state with the same plants in different growth stages. In other states, a lot of it was opportunistic and we relied a lot on NRCS field office staff and other colleagues and partners to collect plants when they were doing other work. [Laughter] So some samples or some species, we might have one to two samples, and other species we might have 43 samples. Yes, it’s an interesting data set and definitely there’s a lot to build on but it’s been really fun to see sort of this preliminary work.

**Madison Kovarna:**

I would say the same thing to bounce off of you, Rae, that a lot of tis data that’s been coming out the last couple of years not only through the Xerces Society but also just a bunch of partners and now SDSU Extension with their new project going on, there’s so much information coming out that I think is bringing light to a lot of things that maybe we didn’t necessarily understand completely which for me has been super intriguing to get into. As you mentioned, the amount of data you’re collecting is immense. There’s a lot of numbers coming back. There’s a lot of samples. There’s a lot of communication back and forth but I have no doubt that that’s been pretty complex to handle and I’m sure it can get to be pretty impressive once you start to look at it all together. But since we’re on the trend of talking about the data and the complexity of it, to bring it down pretty simply, and I’ll ask Rae first. Then, Kaylee, I want to see your opinion on what you’ve seen in the SDSU project but what has been the coolest part of all of this data that you’ve collected? Are you surprised by a certain plant? For me, it was interesting to hear that there’s really no directional difference majorly there that you kind of mentioned a few minutes ago. That was cool for me but was there anything intriguing that you saw in your data as it was starting to come back, Rae?

**Rae Powers:**

Yes. I mean I think overwhelmingly just how positive our results have been. So I think 73% of the species we looked at were meeting the minimum requirement for a lactating cow when it came to crude protein. Then when we got started to look at the total digestible nutrients, that jumped out to about 93% of those plant species. So not only are these plants high in protein but they’re not producing these indigestible fibers that sort of prevent that protein from being usable by a livestock. So I think the first really exciting thing was really how many of these species are actually really good forage. The second piece of this has been we also analyzed about 14 macro and micro minerals and that has been really interesting. I learned a lot about [Laughter] cattle, nutrition, and livestock. That’s just been very complex but of some of those few really primary minerals that we’re thinking about with livestock, our native wildflowers are often performing above minimum requirements and they are nearly always providing more of those macro and micro minerals than our native grass forage at the same time. So as we’re further [Laughter] understanding those minerals, I think we’re starting to see a fuller picture of what these plants are providing. When I started talking with range experts about this work and, “Do cattle eat wildflowers?” a lot of times I’d get the sort of answer like, “Well, you know they probably take a couple of bites probably for minerals.” So I think yes, that’s definitely true but its also providing this really high forage quality. A couple of species that maybe were not super shocking to [Laughter] me because of my background but I think are for many other rangeland practitioners were milkweeds. So in my experience in the sort of South Central Nebraska on some rangelands there, I knew that was a pretty highly desirable livestock feed option was our common milkweed. There has since been some research actually on those sites from the University of Nebraska from Omaha that they’re actually preferentially going to common milkweed and they will even go into pretty dense vegetation to get to that milkweed. We saw that common and surely milkweed had really high protein levels that sustained throughout the growing season. So, it’s like “Oh yes, that’s starting to make a little bit more sense.” But I think a lot of times, we get on this like milkweed is poisonous, it’s toxic, and when it comes to the species in the central and northern Great Plains out on growing range, those species are not high in cardenolides which is the toxic component. None of our species are super toxic here in the Northern and Central Great Plains. So it’s just nice to sort of validate that milkweeds are good especially coming from pollinator and monarch standpoint. Those are plants we really need.

**Kaylee Wheeler:**

Yes, I wanted to add on to what Rae just said about the milkweeds. As far as the coolest part of the data, it’s not really data specific but one of the coolest parts of the project is hearing from producers about their experiences with certain plants. So like Rae said, a lot of us were trained to know certain plants as either palatable or unpalatable for livestock forage and milkweed is one of those things that it has that sticky substance and some people think that its toxic and you wouldn’t think that cattle necessarily would want to graze it but some of the producers I’ve worked with swear that their cattle will go out of their way to eat those milkweeds. So it’s really cool that now we have the data that’s showing, in most cases, almost 20% crude protein and 75% TDN. So to put that into perspective, lactating cow requirements is going to be about 10%-20% crude protein and 50% TDN and lactating small ruminants, so sheep and goats, their requirements are going to be about 15%-16% crude protein and 66% TDN. So when Rae is sitting here saying that over 75% of the plants that they’ve collected have met or exceeded the crude protein requirements of lactating livestock and I think you said almost 90% of the plants you collected are exceeding the TDN or the energy requirement. So that is just fascinating to me that we have this very broad buffet, if you will, for our lactating livestock to go to pick and choose what they eat out on the range to build and meet those requirements. I just think it’s so cool.

**Madison Kovarna:**

Truly, it is impressive that these plants are meeting those minimum requirements for those lactating animals as our lactating animals simply require more of everything. They require more energy, more protein, all those things because now, they’re not only producing for themselves but they’re also producing this nutrient-rich substance for these young that are nursing from them and that takes a lot of energy. That act of lactation requires a lot of input from the animal. The fact that these plants that historically maybe we look out on our rangelands and say, “That’s a weed. I need to broadcast spray or I need to go out there and get rid of it for my cattle to be healthier or for my sheep to have better condition” those types of things. I think its just something that we really need to keep at the forefront of our minds that mother nature made these plants for a reason and maybe we need to look at our management strategy and start to maybe readjust that. I know last time I talked with Kaylee about maybe what species were on her list. Rae, I was curious and you had mentioned you guys had gone the wildflower route, but did you work with Kaylee and her team on that kind of – what’s the word I’m looking for here, the internal team, the major team, the decision makers on making that specie list that we were looking at on this SDSU version?

**Rae Powers:**

Yes, we did. It was really nice to be a part of that conversation and we were able to give them an idea of like, “Okay, we’ve gotten 27 samples of this species in South Dakota so maybe you don’t need to go after that one so extensively.” So they were able to get a full picture of “These are the species that we’ve collected more broadly. This is what we have from South Dakota. What would you guys like to fill in from that data set?” This work with the South Dakota Grassland Coalition and SDSU is exactly the outcome we [Laughter] wanted from this preliminary data set. We just really wanted other people to take this over and take ownership of it because it’s certainly too big and too broad of a project for Xerces and NRCS to take on by ourselves. So it’s just been really delightful to watch it grow and happen in real time. Again, so excited to see the data coming from this year out of South Dakota. It’s just going to be an incredible depth of data.

**Kaylee Wheeler:**

Yes, I will add to that that that’s another awesome part of this project is just the level of collaboration that we have between our organizations. So Xerces really put themselves out on the line by going after these plants first and as Rae said, kind of a shotgun sampling approach to see what they could find. Now, other states, North Dakota State and South Dakota State, have jumped on the bandwagon to help support this work because we’ve realized how incredible the results are going to be. Yes, exactly as Rae said, what we try to do at South Dakota is fill in the gaps of what Xerces already had. So I believe Xerces had about 75 samples or 75 species that they had about a thousand-ish samples during their collection. So we focused in on 30 species in South Dakota and we’ll have about a thousand samples just across the state of South Dakota from this year. So as with all science, the more data, the more sample that you can get, the more that you can really be confident in those results especially when it comes to feed values, minerals, and things like that.

**Rae Powers:**

Yes, definitely. I think our initial data set too only prompted more [Laughter] questions about that could feed on some of this additional sampling but some of the ongoing questions that we’re thinking about are sampling different plant parts to see - because we know cattle are selectively choosing on some plants just certain parts of the plant like the flowering stalk or the flower top. So yes, as soon as you get a little bit of data, all you want is more and more, and you just have more and more questions.

**Kaylee Wheeler:**

Yes. I know probably several universities, SDSU in particular, is wanting to dive into that side of behavioral grazing on the research side. So exactly what Rae just said, we know that cattle, sheep, and goats, they all kind of selectively graze differently and small ruminants in particular, they can get really selective on the plant part. So they can actually graze to select for a high quality diet by being able to just pick the leaves off of the shrubs and things like that. So I think there’s some real value in potentially looking at different plant parts as well.

**Rae Powers:**

Yes. I think the next big push also that I think this data sort of reenergized is even broader than plant parts is actually just diet selection in general and how our actions in management impact what plants cattle are eating and livestock. So I’m excited to hopefully be a part of some research looking at some of that palatability that yes, the more I learn, the more complex it seems to be. [Laughter]

**Madison Kovarna:**

I am a firm believer and I said this last time with Kaylee too that I said it in the realm of cattle but really any livestock species that they will be as picky as we let them. If we give them the tools and just the variety, they will pick a better diet than I could ever dream of making on a paper and giving to a producer to utilize. I think that’s the coolest thing is that our livestock can go out there and do an amazing job. How can we support them in that as well? Rae, you brought up a good point of how this information can be used by not only our producers but our landowners, our land managers, and others. These results are going to affect them and their choices greatly but how can those people that come across this episode utilize the things we talked about or if they find our results published somewhere in their management style of their daily life? What are you hoping that they can get out of these results and use them for decision making? I’ll start with Rae first and then Kaylee, I’ll let you come in and see if you have anything to add or things like that.

**Rae Powers:**

Yes. I think our goal from the outset and first and foremost, I would say I hope this decreases the amount of aerial broadcast broadleaf herbicides that we see on rangelands just knowing that these plants have value. [Laughter] So that’s where the low bar but the high bar, I’m not sure. [Laughter] Kaylee’s heard me speak about this data set before and use this analogy but we have all been to a pretty simple or plain salad bar, right? We’ve been to a salad bar with iceberg lettuce, cheese, ranch, olives, and some pasta salads, and you’ve got to make a meal out of that but we’ve also probably all been to really awesome salad bars where the choices are nearly endless. I’d like to think about which salad bar would I rather make a meal out of and it’s the fancy salad bar that’s providing anything I can dream of and that’s really what I want ranchers to think about their rangelands. You want to have diverse rangelands so that your livestock can make those choices just like you were saying, right? So providing a diverse array of native plants, both grasses and wildflowers, allows our livestock to fulfill their nutritional needs and their mineral needs more fully than a depauperate landscape where we only have grasses and a few species of wildflowers. So I think trying to give any management recommendations that are specific is so hard. It’s just so specific and based on your landscape and your goals but just having that diversity on the ground is the ultimate goal, I think.

K**aylee Wheeler:**

Yes, I’ll add on to that. I think Rae’s analogy of the salad bar is just awesome and I think that is the long-term goal of the work like this and understanding the behavior of grazing. I want to see producers let cows be cows. Like if there’s anything we can do to reduce our supplementation inputs and not having to feed them as much. I mean that’s the number one cost on a cow-calf operation is feeds. So if we can let a cow be a cow, do the work to meet her own nutritional needs, make her own salad if you will, by being able to select whatever plants they can, I just think the potential implications of that is huge especially financially. So yes, just I think understanding every insect, every plant, and every animal has a role to play in the system and I think you know whether you’re a producer out on the landscape or not, it’s really important that we start paying attention to those things. Just figuring out how to take care of our land and how to restore land and what plants I can plant in my garden that’s going to help the pollinators and things like that but I also think there’s potential huge implications with targeted grazing and multispecies grazing. Cattle, sheep, and goats, they have some dietary overlap but general rule of thumb is that if you have a good diverse landscape, you can run one sheep behind one cow and not increase the amount of land that you need but the key there is that you have to have the diversity there so that the animals can select what they need for their diet. Also, targeted grazing to reduce potential undesirables on the landscape and just things like that. I think there’s a lot of potential grazing implications of this research.

**Madison Kovarna:**

Kaylee, you brought up a good point of “What can I plant in my garden to help pollinators?” I think that’s a point that I want to emphasize that we end up talking a lot about producers and I find myself guilty of this of producers and people who have livestock and those who are directly involved. But this type of information can be utilized not only by those people but also at home in your backyard when you’re thinking about what you want to landscape with, what you’re going to plant in your garden. If you’re going to plant just your producing plants, you know those fruits and vegetables, or if you’re going to put some of those native flowers to bring in those pollinators to help you out in that aspect, or are you someone who rents out your land and is just kind of a non-operating land owner? Are you one of those people that can maybe help those that are managing your land for you kind of improve your investment of what you’re doing there. I think that’s a good point to always bring in and that this information that both of you are working so hard on and bringing a lot of information to the table isn’t just for those with those livestock directly under their care. We’re getting close to the end of our episode here. So I just want to open the floor to either of you. If you have any closing comments for our listeners.

**Rae Powers:**

Yes. I think you know kind of as we turn the [Laughter] conversation to pollinators, a lot of times when I’m talking about this work, I really do talk about a lot about livestock and herbicide sprays. Another huge motivator [Laughter] for this work obviously is the insects that are on these landscapes. I just think that rangelands are such a beautiful intermixing of production and conservation. I just really hope ranchers realize the treasure that they have on their property and just what amazingly complex and diverse thing that are happening out [Laughter] there with your flowers, your grasses, and the wildlife that uses them. There’s just so many amazing stories of life out on these properties. So just to bring it back to that and also to stop and take a look [Laughter] because I think once you start noticing the world of invertebrates and insects, it’s so easy just to get sucked in and interested. You’ll quickly find out that there’s more to know than you could ever know and some of it is just mind-blowingly amazing. So just emphasizing how incredible these working lands are and what they bring to both the ranchers and the people that are visiting them but broadly across our society, they’re providing so many resources for humanity so they’re just so valuable.

**Kaylee Wheeler:**

Yes. I would add, Rae really hit it on the nose there but a lot of people when they think of grassland or prairie, they just think of vast areas of gras and sometimes we forget about the complexities. Our rangelands are home to literally thousands of species of grasses, forbs, shrubs, wildlife, insects, livestock, like there’s just so much more out there and we don’t understand a lot of the ecosystem services that our rangelands provide to people that aren’t even a part of production. So yes, the core value behind this work stems from a need to protect and improve our native prairie habitats. I also just want to say this data, at least on the SDSU side, is still rolling in. It can be really overwhelming to [Laughter] just look at all these numbers that we’re talking about. So I would just say also stay on the lookout for extension publications from us and I know that Xerces and NRCS will be publishing stuff as well so just keep an eye out for that stuff.

Rae Powers: Yes and I think I’d also volunteer myself and Kaylee [Laughter] if you’ve got questions or you’re interested. I feel like I’m always open and willing to have a conversation about this data, or rangelands and pollinators in general, so don’t be scared to reach out.

**Kaylee Wheeler:**

Yes, absolutely.

**Madison Kovarna:**

I will be sure to include the contact information for both Kaylee and Rae for those of you who may have questions for them moving forward. As their publications with their data comes out, you guys will be able to get in contact with them and I am for sure or I am for certain that you guys would have a very engaging conversation with those people but I want to thank both Kaylee and Rae for joining me on this podcast. I’ve had such a fun time learning more about rangelands and the plants that call them home. I hope our listeners will take advantage of the information that you have both shared not only with us but all over through your jobs not only on this podcast and I hope that they take that information home to their operations but also in their personal lives as well. With that, 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 next episode, stay curious and keep learning.

**Kiernan Brandt:**

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[Outro music]