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## Eliminating Problems Now To Leave Healthier Soil For Next Generation

*Kingsbury County Producer Utilizes Crop Diversity and Livestock Integration* By: Kara Pugsley

Jesse Hall, farmer in Eastern Kingsbury County, has seen direct benefits from incorporating crop diversity in his rotations and the integration of both goats and cattle. His father started using a no-till farming system in 1988 and when Hall started farming the land in 1996, he continued to focus on how he could improve the quality of his soil. Hall says some of the land he and his family farm is quite hilly, and since it's been farmed since the late 1800s, many of the hills have lost the majority of their top soil. "There's no top soil left, that type of impact is something we have to deal with right now," explains Hall. "Whoever farms this land after me, whether its my son or my daughter, I can eliminate some of the problems so that they don't have to deal with those problems later".

### *Experimenting with rotations*

Hall worked at SDSU and participated in the Sustainable Agriculture Research and Education Program (SARE). As a participant of the program, Hall and others flew around the country attending different soil health events. "We would go to these meetings but then we would come back to South Dakota and actually do the experiments and then we would watch these experiments progress as the summer went by," Hall says. He admits he was a bit of a skeptic at first. "But after seeing the difference that this makes, I was just sold on it, and I brought it home to the farm." Hall had gone to soil workshops in the past and been told his soil didn't have enough microbes in it, and the best way to bring them back was to bring animals back into the system. "It adds a level of profitability," he said. "Raising a third crop helps us increase all the yields on all three crops, then we turn around and put a cover crop in it, which drives soil health," said Hall. "Then we can graze animals on it."

Once Hall started a three-way crop rotation, the wet spots he was seeing on his land went away. "Since we brought in this third crop, our corn and soybean yields have gone up significantly," said Hall. "Additionally, our infiltration rates have increased, and raising oats has given us a chance to diversify the modes of action on our herbicides."

One of the techniques Hall uses is planting a rye, turnip and rape seed mix after oats. "That way it's good for grazing, and then your brassicas will frost kill... the next year, you've got the rye that comes up and then you can plant soybeans into that rye," explains Hall.

### *Benefits of livestock grazing on cover crops*

Jim Finnegan is a neighboring farmer who is also the District Conservationist for Kingsbury County. Hall and Finnegan have a unique mutualistic relationship "We run replacement red heifers and a goat herd on cover crops and grassland around Jessie's place," explains Finnegan. "It gives me a spot to run the goats, gives me forage for them, and it gives Jessie a chance to get livestock on his ground."

"His infiltration rates have gotten faster since the rotation and the cover crops, and the soil health has improved," says Finnegan. "It's become more like the German chocolate cake we are looking for and actually it has some good depth to it rather than just the top couple inches being nice." Their relationship involves Finnegan helping Hall with labor and in exchange Hall is getting the benefit of livestock grazing on his cover crops 11 months of the year for the past 2 years.

### *Effects of rotations on soil health*

Finnegan says adding a small grain into the rotation and adding another small grain as a cover crop will also improve soil quality. "By doing that, you basically make the soil very mallow and porous and you take away that cement slab effect that you get if you are in a just straight corn-soybean rotation," said Finnegan.

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Jesse Hall examines the soil in one of his soybean fields. Since implementing no-till and three way crop rotation practices, his water infiltration rates have increased, allowing his fields to absorb water better reducing runoff. Hall has also seen the structure of his soil improve.

### Director's Secure Future for Memberships

Directors provide consistency in response to lifetime membership inquiry. South Dakota Soil Health Coalition (SDSHC) voted in September for longevity. Although SDSHC recently celebrated only its fourth anniversary directors see lifetime value for members.

Bryan Jorgensen moved to offer lifetime memberships for individuals/spouses at \$500 as well as at \$1000 for other entities. With a unanimous vote lifetime memberships were added as an option to move the mission of "Improved Soil Health" forward.

Directors moved to provide lifetime members with a SDSHC spade to encourage members to keep their soil on the forefront of their operation.

If you are interested in becoming a lifetime member or interested in additional information contact any director or Cindy at 605-280-4190.

### Soil Health School Bright Spot for Unprecedented Year in Southeast



The 4<sup>th</sup> Annual Soil Health School (SHS) is in the books and deemed successful by the committee, despite challenges. With above normal precipitation throughout South Dakota; McCook County received more than double normal precipitation as SHS was set to begin. 2019 SHS demonstrated life experiences felt by producers throughout South Dakota this year. Utilizing the soil health principles is the same but there is no exact recipe card for each field.

SHS is designed to engage participants in managing soils for resilience and profitability. This year's agenda featured classroom exercises from highly respected experts and producers from this region as well as hands on field exercises. Evaluations from participants praised the hands-on field exercises and demonstrations including rainfall simulator, group soil pit activity, structure kits, forage allocation to meet a specific goal when grazing cover crops and insightful classroom presentations that drove tears to the eyes of engaged participants.

The 2019 SHS was hosted by Kurt and Kathy Stiefvater near Salem, including not only the field exercises but all classroom presentations as well. Classroom presenters dove into areas from soil properties, assessments, and biology to crop rotational diversity, agronomics, economics, cover crops and the equipment needed to achieve different goals whether that be machinery or temporary fencing. SDSHC would like to thank the committee members, presenters, participants and everyone who made this years event a success. 2020 Soil Health School will be held in Mitchell, SD with the field exercises at Craig and Gene Stehly's farm. Watch for the updated 2020 SHS agenda!



## Soil Health News

### NCR-SARE IS CURRENTLY ACCEPTING GRANT PROPOSALS!

- RESEARCH AND EDUCATION, DUE OCTOBER 10, 2019
- PARTNERSHIP, DUE OCTOBER 24, 2019
- FARMER RANCHER, DUE DECEMBER 5, 2019
- YOUTH EDUCATOR, DUE NOVEMBER 14, 2019

TO LEARN MORE, VISIT [WWW.NORTHCENTRALSARE.ORG](http://WWW.NORTHCENTRALSARE.ORG),  
OR SEND AN EMAIL TO [NCRSARE@UMN.EDU](mailto:NCRSARE@UMN.EDU)

### Help Line

Resources and Crisis Support  
Call **211** for immediate support  
or contact the  
Avera Farmer Stress Hotline at  
**800.691.4336**

Support is also available by  
texting your zip code to  
**898211** or by emailing

[help@helplinecenter.org](mailto:help@helplinecenter.org)

### Did You Know?

- Plants require 16 essential nutrients; all but three are found in the soil.
- A teaspoon of healthy soil contains 100 million to 1 billion individual bacteria. That is as much mass as two cows per acre.
- Biological life in healthy soil can outweigh the life above it.
- Nematodes are first thought of as pest to agricultural crops, but most nematodes are beneficial.



Seek you counsel of the aged for their eyes have looked on the faces of the years and their ears have hardened to the voices of life. Even if their counsel is displeasing to you, pay heed to them. Kahlil Gibran



### Youth Investment Through FFA and 4-H



Understanding the value of our natural resources continues to be on the forefront of SDSHC as well as partnering with SD FFA and 4H. Students participating in Land and Range Contests learn about the dramatic effect management has on water infiltration, microbial activity and production. In June the Highmore 4H team earned a trip to Oklahoma for the National Land and Range Contest by winning the Soils Days competition near Redfield. Additionally, four land and three range, regional FFA contests were held throughout South Dakota.

Individual winners of the recent contests and \$100 scholarships were:

**Land** : West; **John Pirouteck**, Phillip; Central; **Caden Bottom**, Hitchcock-Tulare; North-east; **Shane Wicks**, Willow Lake; and Southeast; **Grace Digiovanni** McCook Central

**Range**; Central; **Titus Waldner**, Hitchcock-Tulare; West; **TJ Hamar**, Kadoka; Northeast; **Garret Warken-thien**, Willow Lake. Congratulations to the students, parents and teachers.



## Soil Health News

### 60-inch Corn Test Plot Update By Baylee Lukonen

While 60-inch spaced corn with interseeded cover crops may sound radical to many, it wasn't out of the question when we approached farmer David Kruger near Twin Brooks, SD. Kruger understood the benefits it could bring to his soils. For many, this method of farming would make sense for livestock producers, but what about the farmers who don't own their own livestock? David's sole interest in this method of farming all comes down to his soil health. He has spent nearly 25 years practicing no till and while his soils have reached what seems like a peak and plateau, he thinks the increase in biodiversity could increase the organic matter on his land.

After a few planning meetings with partners to determine a game plan, we decided a semi flex corn hybrid would work best in the trial. There were many questions on which chemicals would allow for good cover crop growth, while still providing weed control. David used 26 oz. of Roundup, 8 oz. of LV6, 20 oz. of Verdict, 9lbs of AMS/100 gal of H2O, and 1 qt. of Non-Ionic Surfactant/100 gal of H2O (before emergence). Then straight Roundup at 32 oz./acre was applied right before the cover crop was planted. When it came to fertilizing, we knew that getting the application as close to the row as possible would be crucial. 250 lbs. of 27-18-9, starter 2x2, and 35 gallons of 28-0-0 were side dressed. The corn was planted on May 5th and the cover crop was planted on June 5th. The cover crop blend was an eleven-way mix consisting of a wide variety of species.

Throughout the growing season we have seen a few differences between the 60-inch and 30-inch rows. The most surprising being the plant health in the 60-inch corn being greater than the 30-inch. We may attribute this to the increased sunlight being received by the plants, and even the cover crop. There is certainly something happening below ground that we can't see with our own eyes. We also have seen slightly higher moisture levels in the 60-inch corn, yet never too wet to access by foot or machine if needed, as the soil structure is phenomenal! The cover crop has provided great ground cover and produced about 2850 pounds per acre of biomass (Jason Hermann, NRCS).

The ultimate test will be harvest when it comes down to yield. Protocol's are established to collect sound data and provide an economic work up on the plot! In future years there are plans to include a trial to document the effects on soybeans following this method and add livestock to the mix, as there is plenty of feed available from the cover crop!



Field Tour at Kruger's test plot. Producer's checking out covers and health of the corn .

### Weaning Calves on Cover Crops Warren Rusche

What do we do if it is time to wean calves but the pen isn't ready? That can be a real concern during wet fall seasons, such as 2019. Putting calves into muddy pen conditions is far from desirable, but holding calves on the cows deep into fall increases the risk of adverse winter weather and tends to pull body condition off the cows.

Using cover crops as a feed resource for weaned calves in the fall offers a potential solution for this dilemma. Holding calves out of muddy yards allows for additional time to perform lot maintenance or until the pen surface freezes. Weaning onto annual forages matches up well with fence line weaning where the cows and calves are separated by a fence that still allows nose-to-nose contact.

Dr. Eric Mousel with the University of Minnesota Extension conducted an experiment to compare grazing weaned calves on annual forages to a more traditional backgrounding diet consisting of haylage and dried distillers grains. The two groups of calves were on the separate treatments for 45 days and then fed the backgrounding diet for another 45 days.



In that study the calves grazing the annual forages gained about 1.1 pounds per day compared to 1.7 pounds per day in the backgrounding yard. However, during the second 45 day period when all calves were on the backgrounding diet, the calves who had started on forage outgained the yard fed contemporaries (2.8 vs. 2.5 pound ADG), partially making up for the earlier poor performance. Dr. Mousel suggests that strip-grazing does promote more efficient usage of the forage, but to be certain to move the fence frequently. Being more liberal in forage allowance avoids accidentally restricting intake and allows calves to select a higher quality diet which would support animal performance. Placing feed bunks in the field and delivering supplemental feed is an option if forage quantity is limited or if additional nutrients are needed to hit performance targets. **Continued on page 6**

## Diversity Dilemma

Diversity according to the Merriam Dictionary : *the condition of having or being composed of differing elements* : [VARIETY](#) . Hearing the word, knowing the meaning and its importance are not only key in our daily lives but in agriculture . Eating the same thing everyday would not provide your body with enough nutrients to maintain a healthy body even with continual supplements.

When discussing diversity as one of the five principles of soil health; what pops in your head first? Crop rotations...We can start to mimic the original plant community by using crop rotations which include all four crop types. Diverse crop rotations provide more biodiversity, benefiting the soil food web; which in turn improves rainfall infiltration and nutrient cycling, while reducing disease and pests. Crop rotations can also be designed to include crops which are; high water users, low water users, tap root, fibrous root, high carbon crops, low carbon crops, legumes, and non-legumes to name a few. Diverse crop rotations mimic our original plant diverse landscapes. They are important to the long term sustainability of our soil resource and food security.

The original plant diverse landscape across South Dakota was definitely warm season grasses, cool season grasses, warm season broadleaves, cool season broadleaves. However not corn, wheat, soybeans, and flax, but rather big bluestem, green needlegrass, American licorice, and ground plum milkvetch.



Grassland diversity can decline through management choices as can cropland diversity. Grasslands require to be managed as a precious commodity along with your soil and cropland. Knowing the benefits of the variety of plants in your grassland provides a vital component in long term sustainability. Considerations need to be kept abreast when pondering fall weed management. Spray does not know beneficial plants, insects, or fungi from undesirable; that responsibility is left up to the land owner and operator. Essential follow up is necessary when you entrust that critical component to other companies or individuals protecting your asset, your land. The Diversity Dilemma encompasses both grassland and cropland; try to mimic or retain nature/original plant community.

## Calendar Of Events:

October 10-11  
Women in Ag Conference—Deadwood

October 31-Nov 2  
SD Stockgrowers—  
Rapid City

November 1-2 SD  
Local Food Conf  
Pierre

December 3-5  
SD Cattlemen's  
Pierre

Dec 4 Leopold  
Award Ceremony

December 9-11  
SDACD Pierre

Ag Horizon's  
December 10-11  
Pierre

December 18 SDGC  
Chamberlain

January 15-16  
Soil Health  
Conference—  
Watertown

### *Continued from page 1 Effects of rotations on soil health*

He's been digging up roots and paying attention to the differences. "A lot of people don't think they can make any money on small grain and I disagree," says Hall. He said small grains have to be marketed more. "The one thing you have to take into consideration is the yield bump you get on your corn, your soybean crop after that, and also, if you're grazing after your small grain, your profitability goes up. Even though you broke even the one year, you still make more than you would have in the two-year rotation." Hall's advice to anyone trying something new on their land is: don't be afraid to try something. He advises to experiment on a small scale, but cautions "when you experiment, do it right."

"A lot of people when they experiment try it the wrong way and it fails and then they give up on it," Hall says. Hall says the best thing to do, when beginning your experimentation, is contact your NRCS personnel and talk to the SDSU Extension service. "They're the folks that can help you with that...never be afraid to try something new."

For more information on the principles of soil health, or to view Hall's recently released [Profile in Soil Health](#) video visit our website and follow the SD Soil Health Coalition on Facebook, Twitter and Instagram. All Profile Videos can be found on You tube and at <https://www.sdsoilhealthcoalition.org/videos/> as well as [Merit or Myth segments](#).



Jesse and Laura Hall with son, Hayden and daughter, Cayden.



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*Continued from p. 4 Weaning Calves on Covers*

This study demonstrated that calves can be weaned on annual forages as an option. Performance potential perhaps won't be as high as could be expected in a backgrounding yard, assuming that pen conditions aren't affecting performance. In some cases in an extremely wet fall, the annual forage field might actually be a better environment for the calves during those critical first few weeks.

Some plant mixes will work better than others for promoting calf gain. Work done by Dr. Sandy Smart at SDSU has demonstrated that forage mixes with a greater proportion of grasses support greater animal performance compared to those that are predominately made up of plants such as turnips. Brassicas are much lower in fiber compared to grass species. Low fiber content results in a much more rapid passage rate and less opportunity for plant nutrients to be digested and metabolized.

