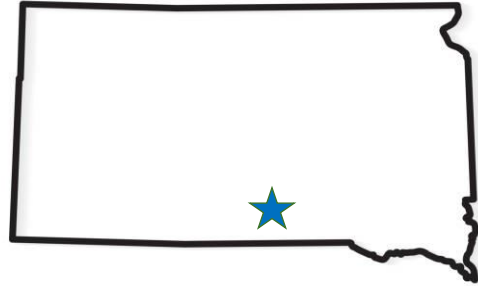




Jorgensen Land & Cattle
— PARTNERSHIP —

Bryan Jorgensen
Chief Agronomy Operations
Officer
Ideal, SD 57541
bryan@jorgensenfarms.com
www.jorgensenfarms.com
(605)840-9005



1



**Owned and Operated
by the Jorgensen
family**

- Family owned since 1909
- 4 partners
- Currently in the 4th generation of management
- 5th generation is on the ground

2



12,000 + Acres of No-Till Crop

- 2000 acres winter wheat
- 3200 acres corn and or milo
- 700 acres mixed species forage
- 1100 acres soybeans
- 700 acres oats
- 600 acres spring wheat
- 1000 acres winter wheat forage
- 700 acres alfalfa
- 2000 acres tame grass hay
- 400 acres food plots
- 2000 acres cover crop behind winter wheat
- Approximately 600 acres full season cover crops

3



8,800 Acres Native Prairie Pasture

4



1100 Head Angus Cow Herd

5



4000 Head CAFO Feedlot Market 5000 + Angus bulls annually

6



Certified Seed

- 25,000 bushels winter wheat
- 15,000 bushels spring wheat
- 60,000 bushels oats

7



Over 2000 pheasants harvested annually



22 rooms, all inclusive lodge and meeting space

Lazy J Grand Lodge

8



Carbon Management The Next Revolution

- Soil Health driven management
- Reducing carbon movement
- Lowering fertilizer and chemical input load
- Using biology and foliar feeding
- Diversifying crop species
- Livestock integration
- More regenerative practices



9



Our Journey to Improved Soil Health began in the mid 1980's

- Began implementing no-till practices on some crops to save moisture and time.
- Expanded to all no-till on all crops in 1991.
- We were not looking at improved soil health, only moisture preservation and better economics.
- Began to expand crop rotation diversity to meet needs of the growing cattle and hog operations.
- Mid 1990's, began introducing bio stimulants and reducing applied inputs.
- Began to understand soil balance and saw improved soil health as a true benefit.
- Today we strive to implement the 5 principles of soil health on all our acres



10



Learning from the Prairie

Native Prairie Soils

- Nature's natural rotation
- OM% of 4%-7%
- Very diverse plant species
- Natural nutrient cycle
- Resilient in weather extremes
- Perpetually active root system
- Bio-active soil
- Perfect soil/plant interaction
- Has proven sustainability with livestock integration



11



What Mother Nature taught us: The 5 Principles

- **Soil Armor** is essential in protecting the soil beneath it from erosion and evaporation.
- No-till was the only way for us to achieve **Low Soil Disturbance** and preserve the armor
- We needed to **Diversify** the crop rotations to use the excess water and break disease cycles
- We needed to have **Living Roots** to support the biology for a longer periods of time...cover crops.
- Found that **Integrating Livestock** grazing on crop land increased soil health and productivity.



12



Rotations

Balance the Needs with Available Acres

- Rule of Thumb: 2 Years in of any given crop type and least 2 to 4 years out

13



Rotations

Rotation Examples:

- CG – CG -- CC --WG – WG – WB or CB
 - Oats – W. Wheat -- CC -- Corn – Milo – Soybean, Pea or Alfalfa --- Repeat
 - S. Wheat – W. Wheat – CC -- Corn – Forage Sorghum mix – Oat/Pea – W. Wheat

14



Cover Crops

- Cycles excess nutrients
- Uses excess soil water
- Protects the soil surface
- Living root...increased biology
- Conditions soil
- Bio friendly host
- Creates habitat
- Competes with ALL weeds
- Lowers herbicide needs
- Promotes beneficial insects
- Creates a great grazing opportunities



15



Cover Crop Management Tips

- Always plant a Multi Species mix
- Pay attention to C : N ratio (20:1)
- Try to incorporate at least 1-2 legumes
- Allow 5-6 weeks before killing frost for seeding
- Avoid residual herbicides on previous crop. Plan ahead!
- Plant shallow... < 1" into moisture
- If not grazing or haying...consider flattening residue to aid in decomposition
- Avoid fertilizing the covers. Let them scavenge

16

60" Corn w/ cover crop

- Looked great early in 2020
- Saw mixed results in yield
- Would be great if we had more consistent moisture
- Need to graze to justify the extra cost of interseeding
- Interseeding timeline is critical to success



17

Oat Cover Graze

- Seeded after corn silage harvest
- No nutrients applied
- Produced great fall grazing
- Provided great ground cover
- Need wet fall to work
- Winter Forage Wheat will work here also



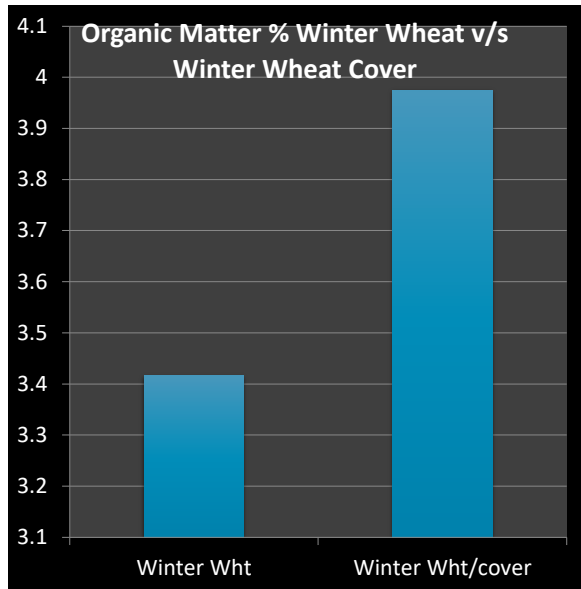
18



Capture the Nutrients!

Case study of field following winter wheat where ½ was planted to cover and the other ½ was not and what the soil tests revealed.

- Increase OM% by .5% or 10,000 lbs of residue by planting cover crop
- Gained an additional 20 lbs of N
- Increased soil water holding capacity by over ½" more rain capture
- Greatly improved soil structure where the covers were planted
- Generally, didn't see any negative impact on yield on next crop



19



18-0173 ACCOUNT 9043
 COMPLETED DATE Mar 22, 2016
 RECEIVED DATE Mar 18, 2016



PAGE 1/2 TODAY'S DATE Mar 22, 2016

Soil Test

JORGENSEN LAND & CATTLE
 31250 265TH ST
 IDEAL SD 57541-6715

13611 "B" Street • Omaha, NE 68135 • TEL: (402) 335-7770 • FAX: (402) 334-9121
 IDENTIFICATION BATCH 3 AS OF 31516

Organic Matter Level

SOIL ANALYSIS REPORT

LAB NUMBER	SAMPLE IDENTIFICATION	ORGANIC MATTER	PHOSPHORUS				POTASSIUM	MAGNESIUM	CALCIUM	SODIUM	pH	BUFFER CAPACITY	PERCENT BASE SATURATION (COMPUTED)				
			PPM	PPM	PPM	PPM							% P	% K	% Ca	% Mg	
295		3.7	13	69	15	675	579	4845	45	6.6	6.7	27.8	4.8	19.4	69.1	6.0	0.7
54326	2201-1	3.7	13	69	15	675	579	4845	45	6.6	6.7	27.8	4.8	19.4	69.1	6.0	0.7
54328	3701-1	4.1	2	22	23	542	436	5947	15	7.6	34.8	4.0	10.4	85.4	0.0	0.5	
54329	15	2.7	0-6														
54330	6	11	0-6														
54331	9	16	0-6														
54332	19	34	0-6														
54333	4	7	0-6														
54334	10	18	0-6														
54335	7	13	0-6														

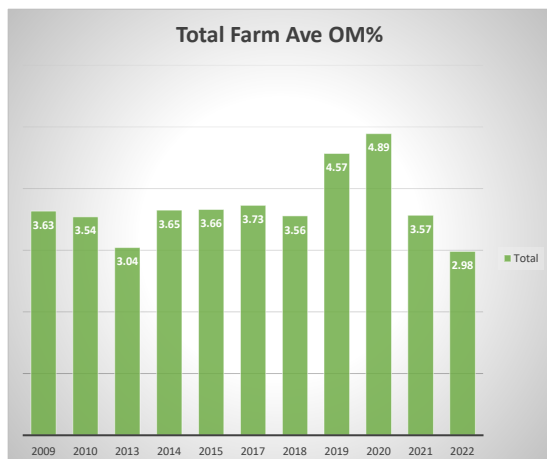
- Strive for Greater than 3%
- 20 to 40 lbs of N per % of OM
- Provides the Fuel for Soil Microbes
- For every 1% increase = 1" of moisture holding capacity

The above analytical results apply only to the sample(s) submitted. Samples are retained a maximum of 30 days. Our reports and letters are for the exclusive and confidential use of our client(s) and may not be reproduced in whole or in part nor may any reference be made to the work, the results, or the company in any advertising, news release, or other public announcements without obtaining our prior written authorization.

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Organic Matter: It Matters!



- In the early 1980's, whole farm OM average was below 1.5% (fallow)
- JLC long term average on all crops is 3.4%
- The higher the OM% the more biology can be supported
- For every 1% gain, we capture 20 to 40 lbs of N and other nutrients
- With each 1% increase in OM, we gain another 1" of water storage (less runoff)
- We avoid stacking low carbon crops like peas and soybeans
- Plant covers behind silage and straw crops
- Native prairie soils are <5% OM

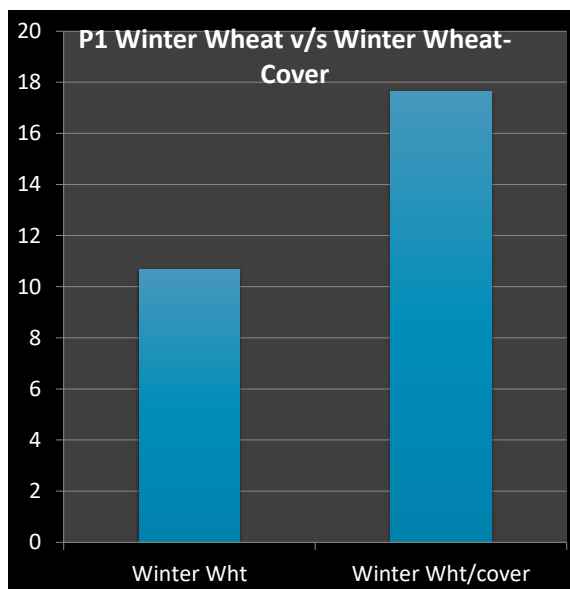
21



Capture the Nutrients!

Case study of field following winter wheat where ½ was planted to cover and the other ½ was not and what the soil tests revealed.

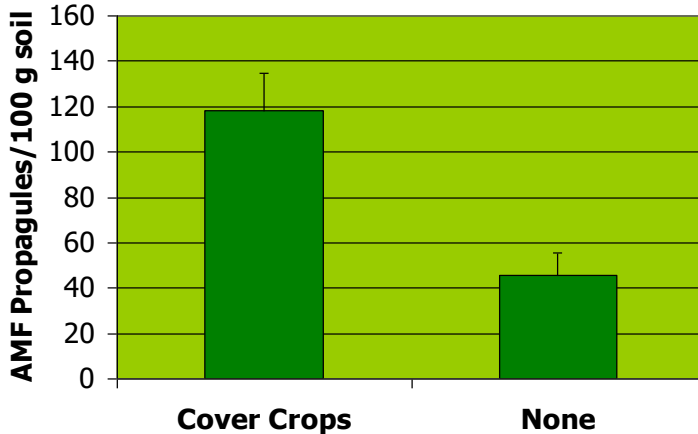
- P1 levels were slightly over 10 lbs on the wheat stubble w/o cover
- P1 levels were nearly double or 18 lbs on the cover crop side.
- It came from biology not an application!



22



Arbuscular Mycorrhizal Fungi (AMF), Jorgensen Farm, Ideal, SD, Nov 2010



Data from: Mike Lehman, Wendy Taheri, Shannon Osborne.
USDA-ARS North Central Agricultural Research Laboratory

23



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PAGE 1/2
TODAY'S DATE
Mar 22, 2016

Soil Test

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31250 265TH ST
IDEAL SD 57541-6715

SOIL ANALYSIS REPORT

Phosphorus

LAB NUMBER	SAMPLE IDENTIFICATION	ORGANIC MATTER	PHOSPHORUS			POTASSIUM			MAGNESIUM			CALCIUM			SODIUM			pH		CATION EXCHANGE CAPACITY			PERCENT BASE SATURATION (COMPUTED)				
		%	ppm	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	SCAL	BUFFER	meq/100g	% K	% Mg	% Ca	% H	% Na		
295	➤Bray P1 Greater than 5 ppm (10 lbs)																	6.6	6.7	27.8	4.8	19.4	69.1	6.0	0.7		
54326	2201-1	3.7	13	69	15	675	579	4845	34	7.0	30.9	5.6	15.6	78.3	0.0	0.5			30.1	4.1	11.5	84.1	0.0	0.3			
54328	2701-1	4.6	2	15	6	483	417	5054	22	7.5	31.6	4.5	8.6	86.4	0.0	0.5			31.5	3.5	10.7	85.5	0.0	0.3			
54329	3001-1	3.2	3	22	23	542	436	5947	15	7.6	34.8	4.0	10.4	85.4	0.0	0.2			31.5	3.5	10.7	85.5	0.0	0.3			
54330	3701-1	3.7	2	22	23	542	436	5947	15	7.6	34.8	4.0	10.4	85.4	0.0	0.2			33.9	4.3	13.1	81.7	0.0	0.9			
54332	3701-1	3.7	6	45	16	525	532	5540	7	7.6	34.8	4.0	10.4	85.4	0.0	0.2			33.9	4.3	13.1	81.7	0.0	0.9			
54333	➤Availability Greatly Influenced by AMF (Arbuscular Mycorrhizal Fungi)																			33.9	4.3	13.1	81.7	0.0	0.9		
54334	18	0-6																		33.9	4.3	13.1	81.7	0.0	0.9		
54335	10	0-6																		33.9	4.3	13.1	81.7	0.0	0.9		
54335	7	13	0-6																	33.9	4.3	13.1	81.7	0.0	0.9		

➤Too high will inhibit biological activity

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IDEAL SD 57541-6715

Soil Test

SOIL ANALYSIS REPORT

LAB NUMBER	SAMPLE	ORGANIC	PHOSPHORUS			POTASSIUM			MAGNESIUM			CALCIUM			SODIUM			pH		CATION EXCHANGE CAPACITY C.E.C.	PERCENT BASE SATURATION (COMPUTED)																								
			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm		SOIL pH	BUFFER INDEX	% K	% Mg	% Ca	% H	% Na																		
295																																													
54325	880	2.7	17	27	47	646	3843	45	6.6	6.7	27.8	4.8	19.4	69.1	6.0	0.7																													
54326	820	2.7	17	27	47	579	4845	34	7.0		30.9	5.6	15.6	78.3	0.0	0.5																													
54328	2701-1	4.5	2	15	6	483	417	5054	22	7.5	30.1	4.1	11.5	84.1	0.0	0.3																													
54329	870	4.8	4	21	9	526	5468	34	7.5		31.6	4.5	8.6	86.4	0.0	0.5																													
54330	800	4.9	4	21	9	526	5468	34	7.5		31.6	4.5	8.6	86.4	0.0	0.5																													
54331	3701-1	4.1	2	22	23	542	436	5947	15	7.6	34.8	4.0	10.4	85.4	0.0	0.2																													
54332	800	2.1	6	16	7	532	5540	72	7.4		33.9	4.3	13.1	81.7	0.0	0.9																													
54333	2001-1	2.0	1	17	22	544	447	3770	19	6.5	26.2	5.9	14.2	71.9	7.7	0.3																													
54334	5003-2	3.7	19	62	23	654	554	4028	19	6.5	28.7	5.8	16.1	70.2	7.6	0.3																													
54335	800	2.6	11	25	17	510	4147	17	6.8		26.2	4.5	16.2	79.0	0.0	0.3																													

Base Saturation Levels

- Calcium: 65% to 80%
- Magnesium: 10% to 25%
- Potassium: 3% to 5%
- Sodium: Less than 1%

25



No-Till & Soil Health Practices Influence on JLC Economics

- Reduced commercial fertilizer applications
- Reduced herbicide and fungicide use
- Reduced equipment cost from fewer passes across each acre than in a conventional tillage system
- Increased planting and harvest windows means less equipment covering more acres
- Use savings to apply biologicals and foliar plant foods
- More resilient crops in dryer years
- Reduced feed costs for livestock from cropland grazing
- Healthier livestock and higher quality feeds and grains



26



Commercial Fertilizer Application

Winter Wheat Case Study 2022

- Yield goal of 70 bu/acre
 - Soil lab recommendation for available Nitrogen is 175 lbs/acre (\$195/acre)
 - Soil lab recommendation for available Phosphorous is 50 lbs/acre (\$38/acre)
 - \$233/acre
- Soil Test results
 - Available Nitrogen was 9 lbs/acre
 - Available Phosphorous was 4 lbs/acre
- Applied quantities
 - 11 lbs/acre of available Phosphorous (\$18/acre)
 - 70 lbs/acre of available Nitrogen (\$77.70/acre)
 - Biology, micronutrients, and foliar (\$25/acre)
 - \$120.70/acre
- **Actual yield was 80 bu/acre**
 - **Cost savings over soil lab recommendations totaled \$112.30/acre**

27



JLC Fertility Program

- Corn, Milo, Cereal grains get 22 gallons of 30% UAN and Thiosul blended with 1 qt zinc side banded (70# N, 10# S)
- Corn, Milo Cereal grains get 4 gal/acre SG 7-25-5 Ortho phosphate with ½ gal/acre micros and biostimulants (11.2# ortho P)
- We will apply live biology in all in-furrow applications
- Will apply foliar sugar, micronutrients and N in small amounts later as needed. Also using Amino Acid N.
- Soybean or Pea generally get 5 – 8 gpa Thiosul sideband or 150 lbs of AMS broadcast
- Will apply foliar sugar, micronutrients and N in small amounts later as needed
- Alfalfa gets 200 lbs AMS in spring and foliar nutrition after each cutting
- Mixed species crops with legumes generally get AMS or Thiosul along with foliar nutrition



28



1895 Air Seeder

- John Deere 1895 40'
- 3 ranks of low disturbance openers
 - 2 seeding ranks on 10" space
 - 1 fertilizer rank on 20" space
- 120-acre payload
- Seed and fertilize at 30 acres/hour with two different fertilizers
- Tractor burns about .6 gal/acre of fuel
- This machine plants about 7500 acres/year and runs in about 8 months of the year

29



1990 Air Seeder

- JD 1990 Single Rank
- 15" Space
- In Furrow liquid
- Light and nimble
- Used on soybeans and cover crop seeding



30



Planter

- JD 1775NT 24 row 30"
- Electric Meter Drive
- Hydraulic Down Force
- Dual Fertilizer side band and in-furrow
- 120-acre payload
- Plants and fertilizes about 35 acres/hour
- Tractor burns about .5 gal/acre of fuel
- Plants about 3500 acres per year



31



Planting/Seeding Efficiencies

- All machines equipped to apply in furrow starter and 2 of the 3 have sideband N & S
- Eliminates separate fertilizer applications which saves us over \$65,000 per year
- Makes more efficient use of nutrients
- Generally, see a 30% to 50% reduction in nutrient load which saves us over \$100/acre per year
- More consistent and uniform crop throughout the field
- Banding creates an acidified zone close to the root zone
- More efficient biological activity



32



Grazing Livestock... We Love the Rumen The Best Harvester

- Cycle Residues to Feed the Soil
- Utilize Cover Crops or Excess Residues
- Adds Biology to the Soil
- Lower Feeding Costs
- Key Factor in Overall Soil Health Improvement
- Promotes Good Overall Animal Health and Disposition



33



2021 Residue Grazing Case Study

- ▶ Grazed a total of 800 bulls between 10/1/21 and 3/1/22
- ▶ 110,000 total grazing days on crop land and residues
- ▶ Grazed a total of 2,880 Acres

34



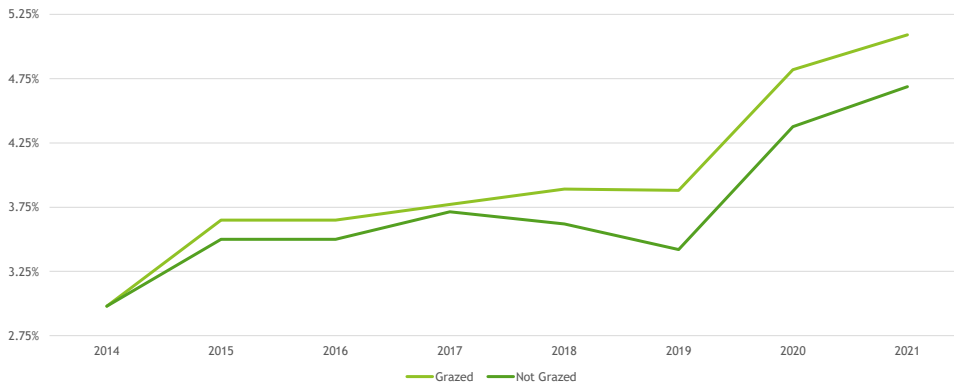
2021 Residue Grazing Case Study

- ▶ Cost per day grazing- \$.74
- ▶ Cost per day in feedlot- \$2.83
- ▶ Cost savings from grazing- \$2.09
- ▶ Total cost savings during time period- \$229,900
 - ▶ \$300 per head
 - ▶ \$80 per acre

35



Soil Test OM%



Grazing Crop Land Builds OM% Faster than Without

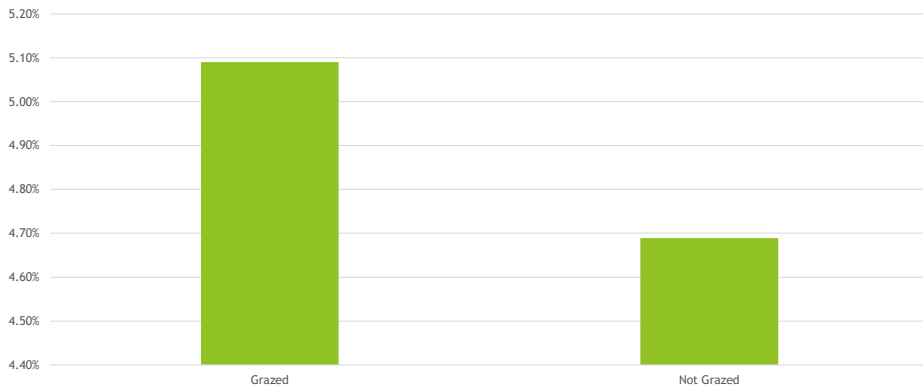
8-year trend on grazed crop land- .26% increase in OM per year

8-year trend on un-grazed crop land- .19% increase in OM per year

36



2021 Whole Farm OM%



Grazing builds OM!

Tested 3800 acres of grazed land and 5000 of not grazed land

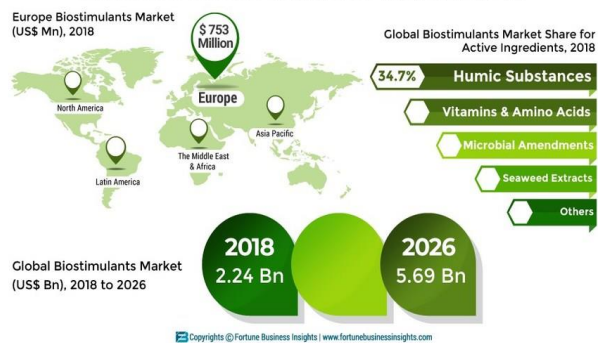


Biologicals, Biostimulants, Soil Amendments, etc...

Very quick growth in the marketplace

- Can be very beneficial but not always a ROI
- Can help lower input costs...less fertility
- Can improve nutrient efficiency
- Can improve plant and soil health
- There are no “silver bullets”
- Products should work in harmony with natural system
- Research the companies and work with ones that help you understand the whole system not just ones that want to sell you a jug of stuff
- Don't be sold on yield guarantees
- Consider them like tools in your toolbox...you may not always need to use them
- Be willing to cut other inputs!!!

BIOSTIMULANTS MARKET





Healthy Soils...Pass them On!

We don't really own the land resource. But rather, we consider it a long-term lease with our next generation. Let's make sure they get their soil back in better shape than when we got it.

Bryan Jorgensen 2019



Thank You SDSHC!



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