
L&C NATURAL AG
OF NATURE, BY NATURE, FOR NATURE
410-476-1495
2024


L&C
2024
NATURAL AG
OF NATURE, BY NATURE, FOR NATURE
The Vital Role of Rumen Microbes

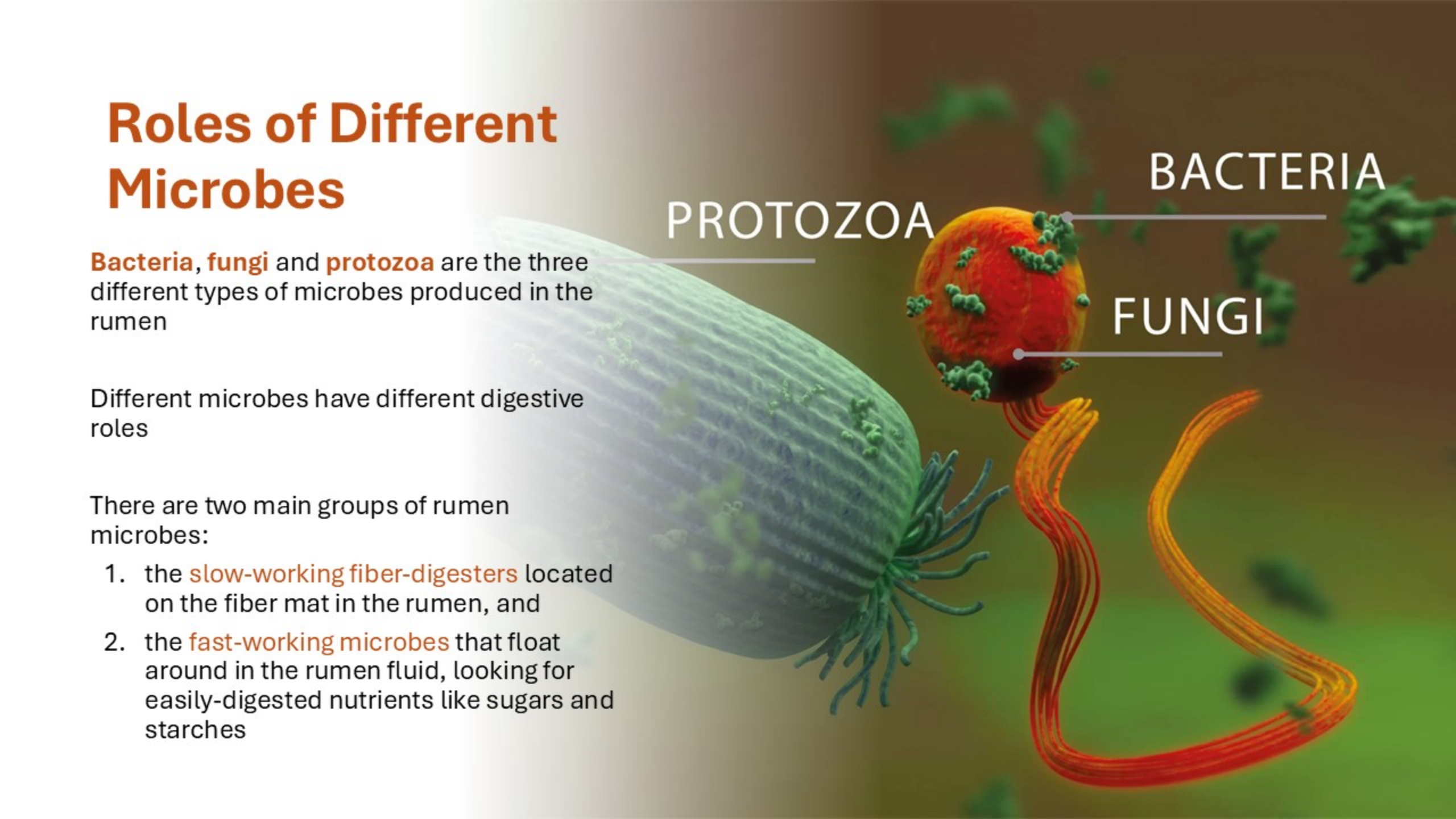
Roles of Different Microbes

Bacteria, **fungi** and **protozoa** are the three different types of microbes produced in the rumen

Different microbes have different digestive roles

There are two main groups of rumen microbes:

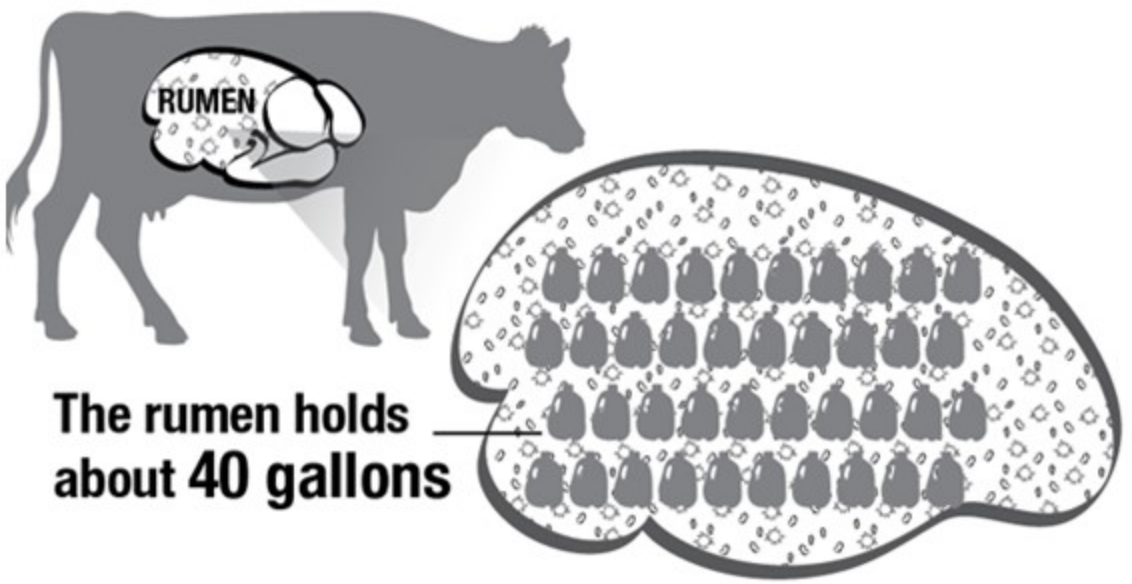
1. the slow-working fiber-digesters located on the fiber mat in the rumen, and
2. the fast-working microbes that float around in the rumen fluid, looking for easily-digested nutrients like sugars and starches

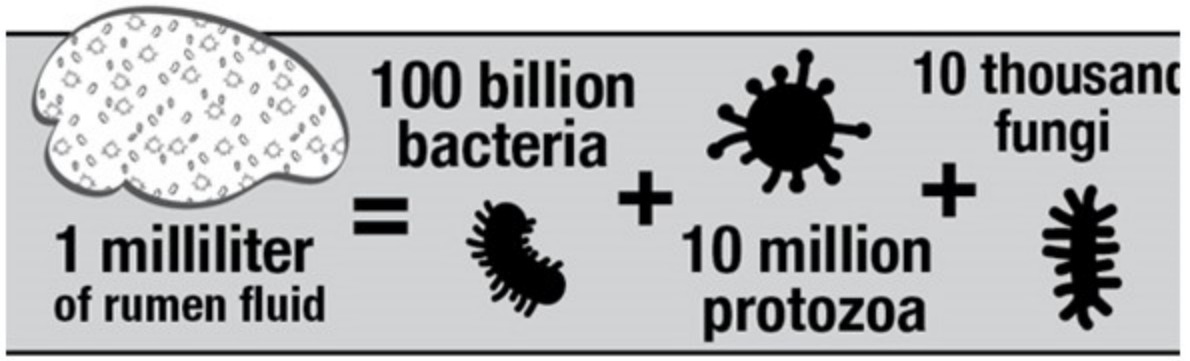


Roles of Different Microbes

Microorganism	Number	Function in the Rumen
Bacteria	10^{10} cells/mL	Ferment/degrade a range of substrates and reproduce
Protozoa	10^{5}–10^{6} cells/mL	Ferment/degrade substrates, engulf starch, bacteria, and particles, and reproduce
Archaea	10^{7}–10^{9} cells/mL	Metabolize hydrogen
Fungi	10^{3}–10^{5} zoospores/mL	Source of cellulolytic enzymes Fiber degradation and digestion
Bacteriophages	10^{8}–10^{9} cells/mL	Infect bacteria

Data from Refs.[2,11–17]





≥ 1,000,000,000,000,000
rumen bugs per cow

Aren’t Bacteria & Fungi Bad?

Bacteria and fungi are generally beneficial, and a definite necessity for proper gut function. The problem occurs when the gut microbiome becomes imbalanced. When there is an overpopulation of one species, a PATHOGEN is created.

L&C NATURAL AG

OF NATURE, BY NATURE, FOR NATURE

JOHN DEERE FINANCIAL

American Grassfed©

www.windrivermicrobes.com

Remarkable infection recovery with Balancer2: witness the astounding transformation of a severe infection over just six days. These images capture the progression from day one, where the infection was evident, to day 3, displaying noticeable improvement, and finally, day 6, where the infection was nearly cleared. Balaner2's microbial power expenditures healing, promoting a quick and effective recovery.

The rancher shared this image with us.

An Ounce of Prevention…

- **…is Worth a Pound of Cure.**

- A typical pathogen treatment includes some type of antibiotics or antifungal, which can sometimes be very costly, particularly when running a stocker operation.

- However, if you work to maintain a balanced gut microbiome, you'll experience a decrease in antibiotic usage and vet bills.

- Gut balance can be significantly improved by incorporating a balanced microbe formula into the diet.

The Importance of Rumen Microbes in Milk Production

- Increasing the production of microbes in the rumen is the key to lifting milk production and composition
- Microbes break down feed to produce volatile fatty acids, which are used by the cow as energy for maintenance and milk production
- The rumen microbes are also digested and absorbed in the small intestine of the cow as the main protein source for milk production – providing up to 70-90% of a cow's protein requirements

NATURAL AG
OF NATURE, BY NATURE, FOR NATURE

90-Day Trial On Fresh-Weaned Calves

The full report can be found at www.WindRiverMicrobes.com

- The "Treated" group gained on average, 2.80 lbs/hd/day versus the "Control" group's 2.69 lbs/hd/day during the first 56 days.
- The gain difference is +0.11 lbs/hd/day for the treated group. During the last 30 days, the treated group gained an average of 2.72 lbs/hd/day compared to the control group's 2.57 lbs/hd/day

That extra 15 to 30 lbs can be the difference between making it or breaking it...

JOHN DEERE FINANCIAL

American Grassfed©

NATURAL AG

OF NATURE, BY NATURE, FOR NATURE

Day 1 of weaning

Day 20 of weaning

Importance of A Consistent Diet

Without an incorporated microbe regimen, microbe populations take time to recover and build up after sudden feed changes, or illness

- Forage/fiber-digesting microbes may take 4-6 weeks
- Starch/grain-digesting microbes take 4-5 days
- Lactic acid-producing bacteria take 2-4 hours to build up

If diet consistency is not maintained, the required microbes will not be present in sufficient numbers for optimum digestion.

NATURAL AG

OF NATURE, BY NATURE, FOR NATURE

Feed Efficiency

When it comes to producing livestock, feed conversion efficiency is vital. We all know there are factors that affect those conversion rates – weaning, sickness, stress, environment, etc. – some are easily managed, others are not. When we doctor cattle with antibiotics, beneficial microbes are destroyed, creating a gut imbalance. This doesn't mean to avoid antibiotics because sometimes, they're crucial. However, as ranchers, we can focus on keeping gut health in-check by administering balanced, beneficial microbes for faster recovery rates and stress reduction.

Before the use of BalanceR2

Fibers not broken down

Grains not broken down

After 12 days on BalanceR2

American Grassfed©

No grains and minimal fibers out the back end.

Fibers not broken down

Grains not broken down

This is Money lost not only in feed but in weight not gained.

Feedlot Study

In a feedlot study, Balancer^2 produced these facts:

- **15% better feed consumption**
- **15% increase in ADG**
- **8% increase in feed conversion**

The cattle in this study received 19ml/head/day in their water, from start to finish. When you figure the cost of feed per pound of gain 8% increase in feed efficiency is HUGE.

Texas feedlot

A test was conducted to evaluate the impact of BalanceR2 on cattle in a feedlot.

The cattle were split into two groups and given the same amount of feed. One group was treated with BalanceR2, while the other group received no treatment. Both groups were weighed initially, and the results revealed an **average weight gain of 80** pounds per head for the treated group.

The BalanceR2-treated cattle also showed improved overall health and exhibited fewer signs of stress compared to the untreated group. This significant weight gain, along with enhanced health and reduced stress, highlights how much feed is typically wasted through inefficient digestion and how optimizing gut health can lead to better performance, reduced stress, and more efficient feed utilization.

L&C NATURAL AG

OF NATURE, BY NATURE, FOR NATURE

Shephard Feed

40m ·

We have had our show bulls and feeder steers on Balancer2 for about two weeks. Before starting Balancer2 the bulls were eating one bucket of feed between the two of them and now they are eating about a bucket and a half a piece daily. The steers were eating about half a mineral daily. Now they are eating a full mineral tub in the morning with two buckets of cottonseed and most evenings an additional two buckets of feed. Everything that we have had on the Balancer2 has been more active, they are eating more hay, and they are consuming more water. We are currently using about a 1/3 of ounce per 100 pounds every other day.

- In aquaculture business, feed conversion and water quality management are most important factors.
- Uneaten feed in the pond will destroy water quality, H2S, NH3 and NO2 will increase, and are harmful to animals.
- Less feed in the pond, shrimp won't grow (normally sizes 20-25 grams per shrimp in 80-90 days, for marketable sizes)
-

- Reboot experimental:
-

- 1- Spray 15-20 ml of reboot per 1 kilogram of feed.
-

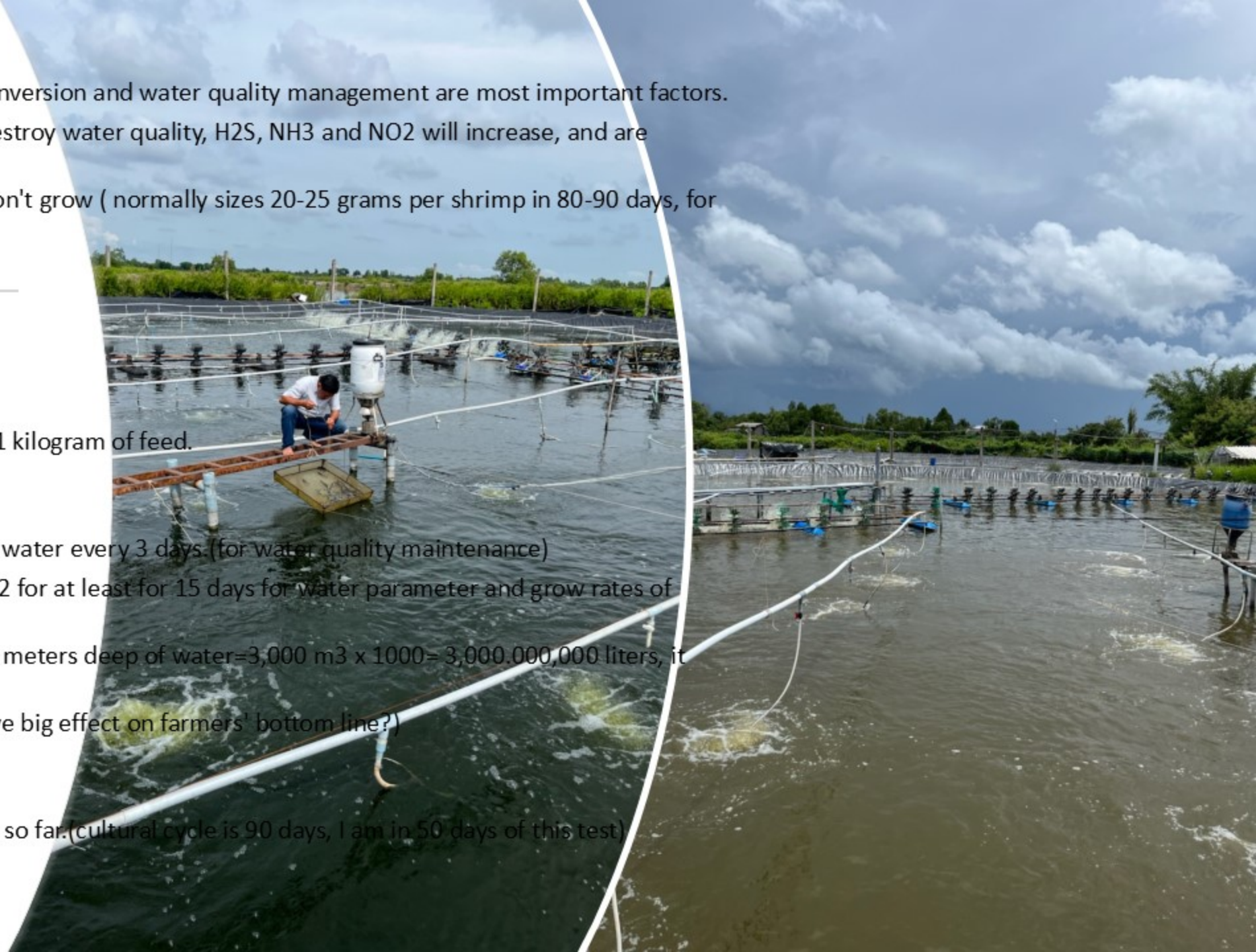
- 2- apply 3 ppm reboot to pond's water every 3 days.(for water quality maintenance)

Monitor: pH, DO, NH3, H2S and NO2 for at least for 15 days for water parameter and grow rates of shrimp.

- Pond size: 2000 Sq. meters X 1.5 meters deep of water=3,000 m3 x 1000= 3,000.000,000 liters, it would 9 liters of Reboot
- for each treatment (this may have big effect on farmers' bottom line?)
-

- Results for these test "Fantastic" so far.(cultural cycle is 90 days, I am in 50 days of this test)
-

-



In aquaculture business, feed conversion and water quality management are most important factors.
Uneaten feed in the pond will destroy water quality, H_2S, NH_3 and NO_2 will increase, and are harmful to animals.
Less feed in the pond, shrimp won't grow (normally sizes 20-25 grams per shrimp in 80-90 days, for marketable sizes)

Reboot experimental:

1- Spray 15-20 ml of reboot per 2.2lbs of feed.

2- apply 3 ppm reboot to pond's water every 3 days.(for water quality maintenance)
Monitor: pH, DO, NH_3, H_2S and NO_2 for at least for 15 days for water parameter and grow rates of shrimp.
Pond size: 2000 Sq. meters X 1.5 meters deep of water=3,000 m^3 x 1000= 3,000.000,000 liters, it would 9 liters of Reboot for each treatment (this may have big effect on farmers' bottom line?)

Results for these test "Fantastic" so far.(cultural cycle is 90 days, I am in 50 days of this test)

Product Benefits in Beef Production

Decreases...

- Sickness & disease
- Antibiotic inputs/vet bills
- Lethargy & stress
- Labor costs of doctoring
- Mortality rates

Increases...

- Feed conversion efficiency
- Water intake
- Immune function
- Digestive function
- Production rates
- Milk quality

PROFITS!

American Grassfed®

L&C NATURAL AG
OF NATURE, BY NATURE, FOR NATURE

JOHN DEERE FINANCIAL

Did you know that the gut and soil operate similarly, relying on microbial communities for essential functions? Just as microbes aid digestion and support immune function in the gut, they also decompose organic matter, release nutrients, and suppress pathogens in soil ecosystems. These parallels underscore the importance of promoting beneficial microbial diversity for the health and productivity of both the gut and soils.

www.windrivermicrobes.com

NATURAL AG
OF NATURE, BY NATURE, FOR NATURE

Increased Stress Tolerance

Wind River Microbes' solutions help crops become more resilient to weather extremes and climate variability. Plants are better equipped to withstand drought, excessive rain, and temperature fluctuations. Our microbial solutions improve water utilization efficiency, allowing plants to flourish in arid and water-limited environments.

For more information on reductions, visit us at
www.windrivermicrobes.com

American Grassfed©

JOHN DEERE FINANCIAL

NATURAL AG

OF NATURE, BY NATURE, FOR NATURE

Healthy Soil You Can See:

These images exemplify the transformative influence of Wind River Microbes' products on distinct farms in different states. The evident enhancements in soil health and plant growth underscore the wide-ranging advantages of our microbial solutions across diverse agricultural settings. Microbes facilitate a natural "gluing" process that attaches soil particles to plant roots, bolstering soil stability and deterring erosion. This mutual relationship heightens nutrient absorption efficiency and cultivates a varied soil microbiome, ultimately nurturing healthier plant development and promoting enduring agricultural practices.

www.windrivermicrobes.com

American Grassfed©

JOHN DEERE FINANCIAL

Planted on June 6th. Photo taken July 8th.

Analyzing cotton fields in Winters, Texas, the striking contrast between the images provided by the farmer underscores a significant distinction between the two fields. Interestingly, the fields are separated merely by a driveway. Importantly, the field treated with Wind River Microbes' Soilcare witnessed a notable reduction in inputs by half, showcasing its superior performance compared to the control field.

www.windrivermicrobes.com

NATURAL AG
OF NATURE, BY NATURE, FOR NATURE

Clearly evident is the profit per acre resulting from a year one application, which amounted to $59.17 per acre.

It's important to note that these figures don't account for the cost savings achieved by halving inputs or the additional cotton weight after trash filtration. Additionally, the treated side exhibits lower trash content, as illustrated in the visible differences.

JOHN DEERE FINANCIAL

	East- Microbe	West - Control	Difference
No. of Acres	50.00	71.00	
No. of Bales	58.00	74.00	
No. of Bales/Acre	1.16	1.04	
Avg Weight / Bale	475.00	474.00	
Total Weight	27,550.00	35,076.00	
Lbs/Acre	551.00	494.03	56.97
Price/Lb	$ 0.70	$ 0.70	
Total Price	$ 19,285.00	$ 24,553.20	
Price/Acre*	$ 404.99	$ 345.82	$ 59.17

Other Information			
Avg Leaf	2.01	2.46	
Avg loan	55.0674	52.9689	2.0985
Avg mic	3.91	3.72	
Avg staple	35.86	35.62	
Avg strength	30.36	30.03	
Avg uniformity	79.43	79.4	
Avg color RD	80.5	78.8	
Avg trash	1.7	2.7	
Avg length	111.5	111.7	

The price and savings represented in this report does not include the following:
Savings from reduction of inputs in the microbe field
Net weight of cotton after filtering of trash
**The Price/Acre represents $.05 per lb more due to the higher quality of the cotton in the microbe field. The results in other applications may be be different than the results in this report.*

www.windrivermicrobes.com

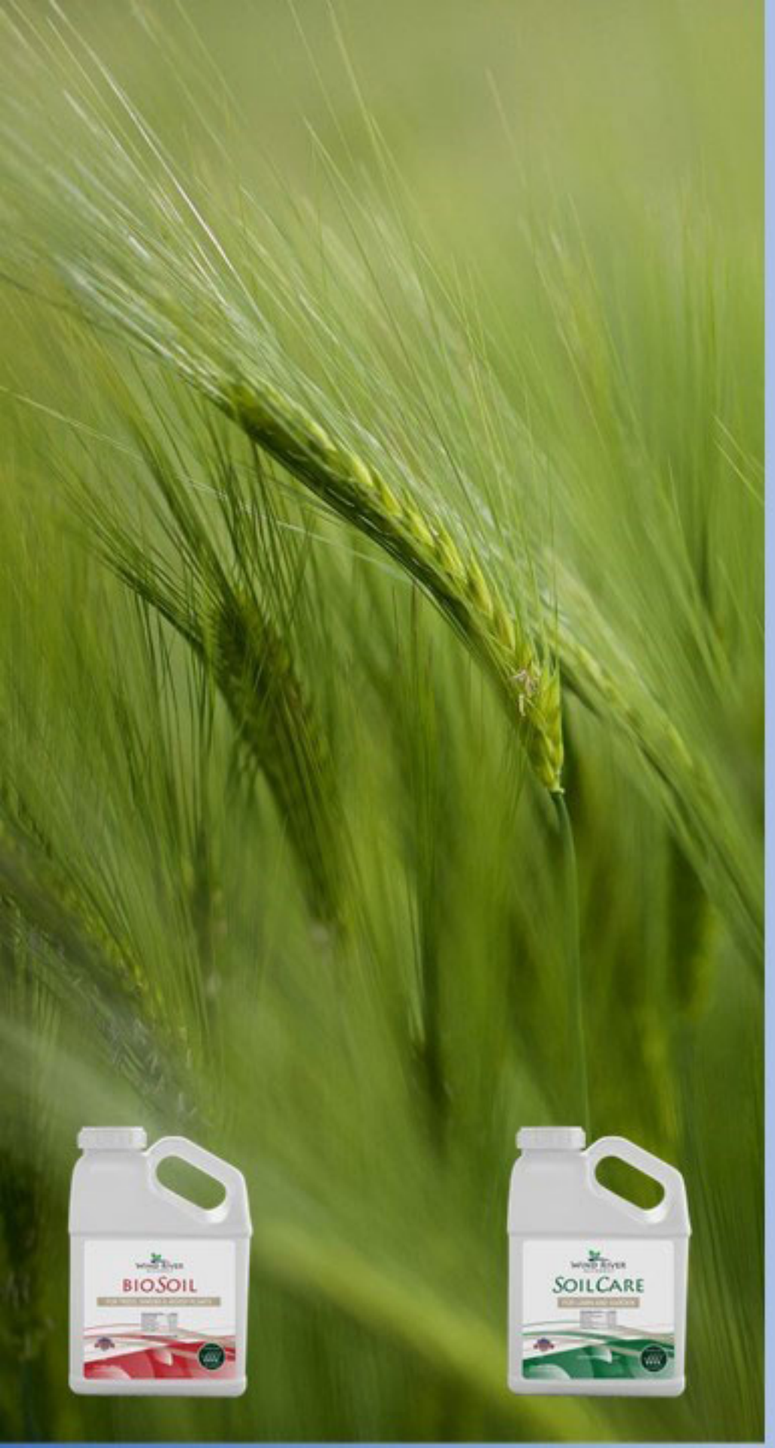
American Grassfed©

L&C NATURAL AG
OF NATURE, BY NATURE, FOR NATURE

JOHN DEERE FINANCIAL

Did you know that microbes play a crucial role in feeding plants and enhancing their growth? These tiny organisms form a symbiotic relationship with plant roots, creating a powerful partnership known as mycorrhizae. Through this connection, microbes extend the plant's reach into the soil, accessing nutrients and water that might otherwise be out of reach. In return, plants provide the microbes with sugars created through photosynthesis. This exchange not only aids the plant's nutrition but also boosts its resilience against environmental stressors. By fostering this intricate microbial-plant relationship, Wind River Microbes ensures that crops receive the nourishment they need for optimal growth and productivity.

www.windrivermicrobes.com



NATURAL AG
OF NATURE, BY NATURE, FOR NATURE

Improved Productivity

Our microbial solutions facilitate better nutrient uptake and root development, resulting in increased crop yields. The enhanced plant health improves resistance against stressors, pests, and diseases.

For more information on reductions, visit us at
www.windrivermicrobes.com

American Grassfed©

JOHN DEERE FINANCIAL

NATURAL AG
OF NATURE, BY NATURE, FOR NATURE

Benefits

Maximize Nutrient Utilization

The unique microbial communities in our products facilitate the efficient uptake of essential nutrients, ensuring that plants have access to the building blocks they need for accelerated growth.

For more information on reductions, visit us at
www.windrivermicrobes.com

American Grassfed©

JOHN DEERE FINANCIAL

L&C NATURAL AG

OF NATURE, BY NATURE, FOR NATURE

Confronted with iron chlorosis and struggling to find a viable iron source, this farmer reached out to us inquiring about the effectiveness of our product. At this point, the farmer was ready to abandon the field. The bottom image reveals the soil's iron-rich red hue, yet the plants couldn't access it due to the lack of microbes. Notably, no rainfall occurred between these snapshots. A video and time-lapse can be found on our website showcasing this transformation. Facing the possibility of abandoning the field, the farmer opted for treatment, ultimately realizing a substantial 26-bushel-per-acre yield increase – more than justifying the investment in our microbes.

American Grassfed©

JOHN DEERE FINANCIAL

www.windrivermicrobes.com

JOHN DEERE FINANCIAL

L&C NATURAL AG
OF NATURE, BY NATURE, FOR NATURE

American Grassfed©

Enhancing Nutrient Cycling through Microbes:

Wind River Microbes pioneers a transformative strategy to amplify nutrient cycling within ecosystems. Our microbial solutions work in synergy with plants, accelerating the breakdown of organic matter and releasing essential nutrients back into the soil. Additionally, our specialized nitrogen-fixing microbes are crucial in harnessing atmospheric nitrogen and converting it into plant-available forms, enriching the soil with this vital nutrient. These microbial collaborations optimize nutrient utilization, minimize nutrient runoff, and foster sustainable agricultural practices, ultimately improving soil fertility, plant growth, and long-term ecological balance.

www.windrivermicrobes.com

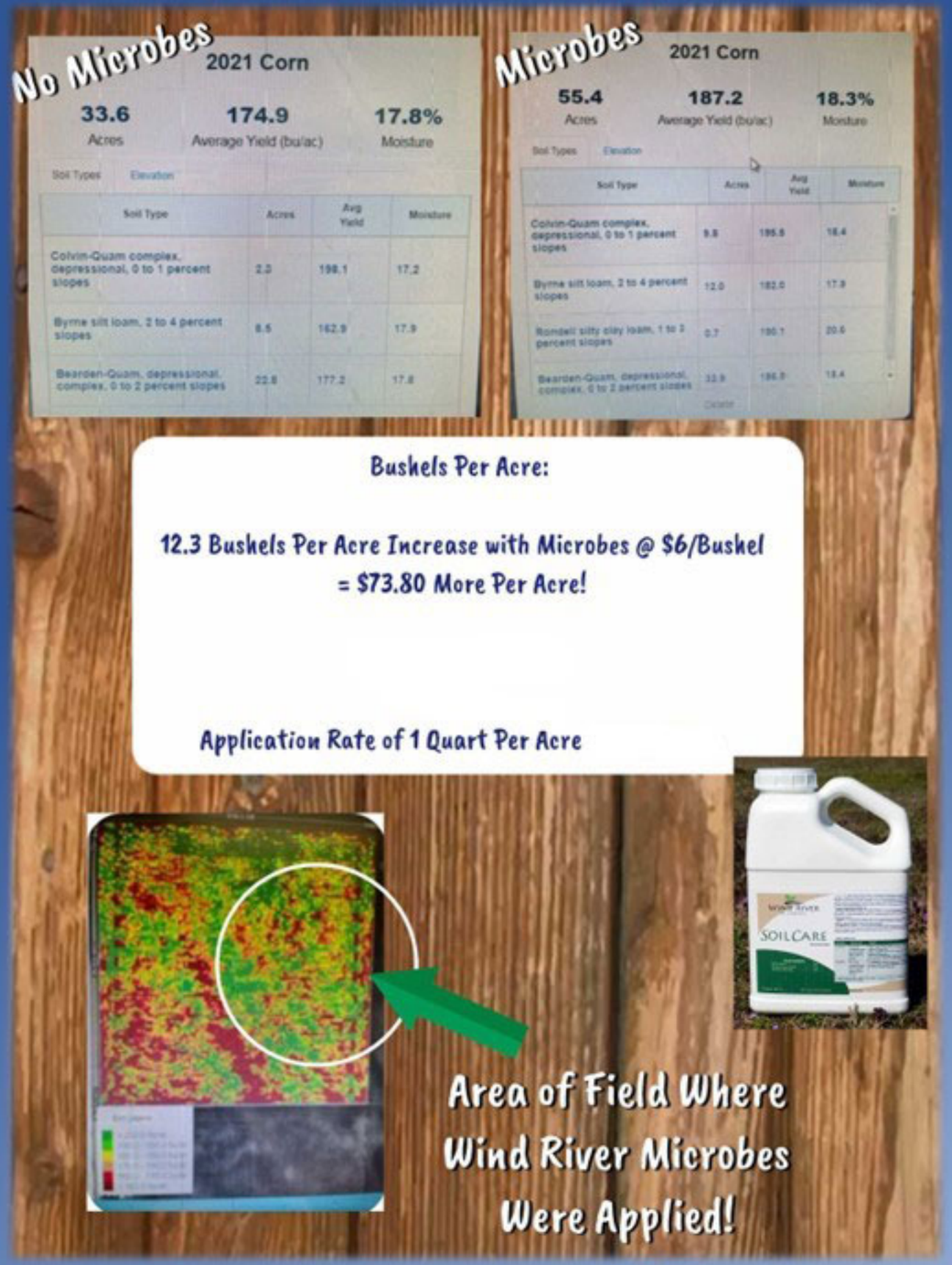
30 bushel to the acre increase in year one

Engaging in a distinctive venture, this multi-generational farm embarked on an experiment, treating alternating 60-foot sections of their field with Wind River Microbes. This photo captures the perspective along that line. Utilizing advanced equipment, they meticulously tracked production within each strip. During the initial year, the treated sections yielded a remarkable increase of 30 bushels per acre, surpassing the untreated areas. Continuing into the third year of product utilization, they effectively minimized the application amount while achieving a significant augmentation of 70 bushels per acre above their average before incorporating Wind River Microbes.

www.windrivermicrobes.com

L&C NATURAL AG
OF NATURE, BY NATURE, FOR NATURE

The farmer shared this image with us.



L&C NATURAL AG

OF NATURE, BY NATURE, FOR NATURE

In the state of Minnesota, a farmer has recently made waves in the agricultural industry by achieving a significant profit surge in their corn crop. The farmer managed to increase their earnings by an impressive $73.80 per acre. This success was due to an interesting change in their product usage strategy. By the third year of implementing this new strategy, the farmer had managed to reduce their product consumption to just one quart per acre annually, with a cost of $13.75 per acre. This was a significant reduction from their previous usage levels. As a result of this new approach, the farmer's earnings surpassed the control scenario by a substantial $60.05 per acre. This success showcases the importance of innovative thinking and strategic planning in the agricultural industry. It is a testament to the fact that even small changes can result in significant improvements in profitability.

www.windrivermicrobes.com

American Grassfed©

JOHN DEERE FINANCIAL

L&C NATURAL AG
OF NATURE, BY NATURE, FOR NATURE

In Minnesota, an agricultural producer has reaped substantial benefits from their soybean cultivation, experiencing a remarkable upswing in profits to the tune of $81.60 per acre. Over the course of three years, a gradual transition occurred in their product utilization, culminating in a consumption rate of merely 1 quart per acre on an annual basis, entailing an expenditure of $13.75 per acre.

This strategic alteration in their product employment had a transformative impact on their agricultural enterprise. The result was a significant economic advantage, with their net earnings surpassing the financial performance observed in the control scenario by an impressive $67.85 per acre. This is a compelling testament to the potential of carefully calibrated adjustments in agricultural practices to yield remarkable returns.

www.windrivermicrobes.com

American Grassfed©

JOHN DEERE FINANCIAL

Cowpea plants.
No Microbes left.
Year one Microbes Middle.
Year two Microbes Right.

NATURAL AG
OF NATURE, BY NATURE, FOR NATURE

Enhanced Plant Quality

Our microbial solutions lead to healthier and more robust plants, producing better-quality produce. This can translate into higher market value and consumer preference.

For more information on reductions, visit us at
www.windrivermicrobes.com

American Grassfed®

JOHN DEERE FINANCIAL

American Grassfed©

L&C NATURAL AG
OF NATURE, BY NATURE, FOR NATURE

JOHN DEERE FINANCIAL

A difference you can see.

Control Cowpea *(untreated)*

Year two Cowpea *(treated)*

For more information, visit us at
www.windrivermicrobes.com

NATURAL AG
OF NATURE, BY NATURE, FOR NATURE

JOHN DEERE FINANCIAL

Did you know that microbes play a crucial role in root growth and development by forming symbiotic relationships with plants? Certain types of microbes, like mycorrhizal fungi, extend their reach into the soil, enhancing the surface area of the roots, and increasing the uptake of water and nutrients. Microbes also produce hormones and enzymes that promote healthy root growth and branching, resulting in more resilient and productive plants. Microbes promote root growth and contribute to overall plant health, resilience, and productivity.

www.windrivermicrobes.com

NATURAL AG

OF NATURE, BY NATURE, FOR NATURE

I wanted to share some exciting results from our recent experiment with squash plants. We started these plants from seeds in our greenhouse, ensuring they all had the same starting point. We provided them with equal amounts of water throughout their growth.

What's truly remarkable is the difference we observed when we treated one side of the plants with Wind River microbial solutions. As you can see in the photos, the plants that received the microbial treatment exhibited significantly better growth. Their foliage is healthier, they're more robust, and this is leading to a notable increase in production.

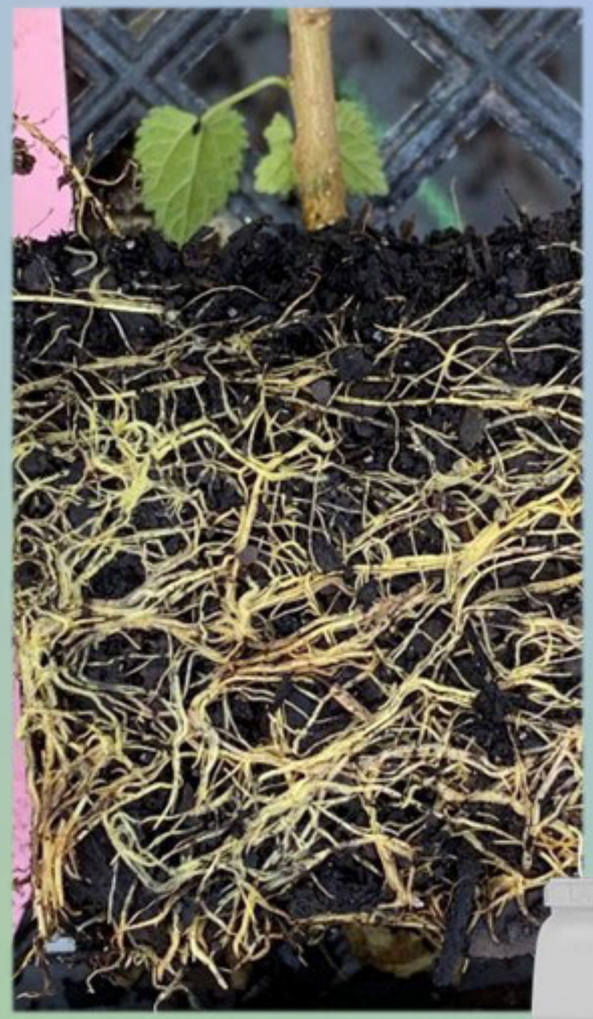
This is a compelling example of how applying microbial solutions can make a substantial difference in plant health and crop yield. We're thrilled with the results so far and are eager to continue monitoring their progress.

American Grassfed©

JOHN DEERE FINANCIAL

www.windrivermicrobes.com

Control *(untreated)*



BioSoil *(treated)*

L&C NATURAL AG
OF NATURE, BY NATURE, FOR NATURE

The efficacy of Wind River Microbes is demonstrated through this rigorous, double-blind study, involving 800 trees. The study addressed declining tree health in a municipality facing substantial tree loss. The incorporation of bio*Soil* resulted in a remarkable increase in root growth on the right, showcasing the positive impact of our product. Furthermore, reports from tree installers from another city in Texas indicate that tree loss ceased after incorporating bio*Soil*, emphasizing its role in fostering healthier trees and contributing to the preservation of urban greenery.

www.windrivermicrobes.com

JOHN DEERE FINANCIAL

American Grassfed©

NATURAL AG
OF NATURE, BY NATURE, FOR NATURE

Input Reduction

2, 4-d: 50-66% reduction rate

RoundUp: 50% reduction rate

Dicamba: 50-66% reduction rate

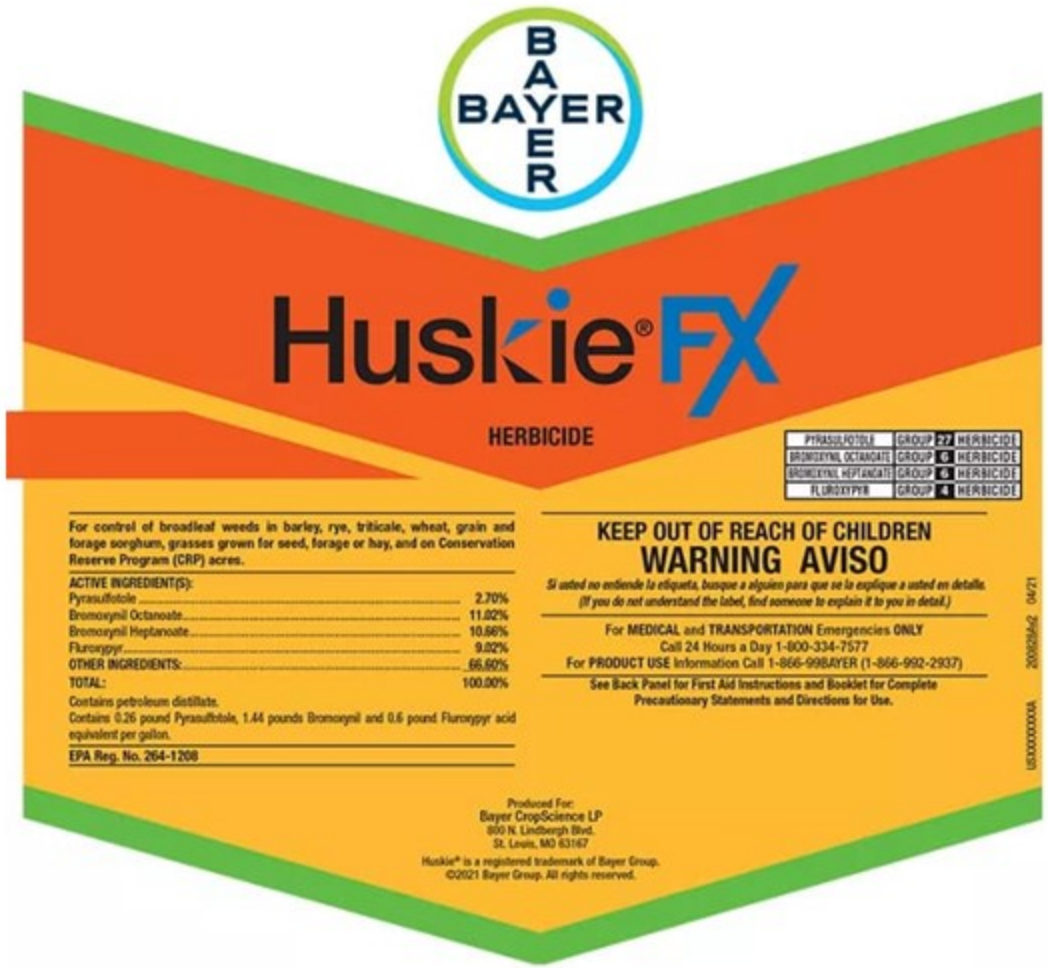
For more information on reductions, visit us at
www.windrivermicrobes.com

American Grassfed©

JOHN DEERE FINANCIAL


Full rate
Dicamba
Dicamba with
Microbes.
L&C
2024
NATURAL AG
OF NATURE, BY NATURE, FOR NATURE


L&C
2024
NATURAL AG
OF NATURE, BY NATURE, FOR NATURE



CROP ROTATION

Huskie FX Herbicide breaks down in the soil mainly by microbial degradation. Under adverse conditions such as cold temperatures and drought conditions, degradation can be slowed.

Observe the intervals listed below for the minimum time between application of this product and planting of the crops indicated and follow the additional instructions provided, if applicable. For crops not listed here, conduct a small-scale field bioassay before planting into fields treated with Huskie FX Herbicide the previous season.

DO NOT plant any crop that is not included on this label for use with this product within 120 days following a Huskie FX Herbicide application.

L&C NATURAL AG
OF NATURE, BY NATURE, FOR NATURE

Reduce Salt Deposits

Our microorganisms play a vital role in reducing the negative impact of soil salinity, helping plants adapt to saline soils and maintain optimal growth.

For more information on reductions, visit us at
www.windrivermicrobes.com

American Grassfed©

JOHN DEERE FINANCIAL

How are Wind River Microbes different from all other microbe formulas on the market?

1. **Formulation**. Our microbes are NOT derived from lactating dairy cow manure. Using manure allows too much variability in species. Wind River Microbes' formulas are assembled in a kitchen, much like a cake recipe, using specific microorganisms for specific tasks within the microbiome.

2. **Indigenous microbes.** In our formulations, we have added specific species of bacteria that are used for Horizontal Gene Transfer (HGT). This process enables our microbes to adapt to soils worldwide, and work in conjunction with indigenous microbes to effectively balance and diversify the indigenous microbiome.

3. **Stability**. When developing formulas using cow manure, it generally takes 6-9 months to cure a stable formula. In particular, the *E.Coli* and *Salmonella* must be allowed to cure out, so an imbalanced solution is not being applied. Because of our "manufacturing" process, we have a completely stable formula in 4-5 days.

4. **Temperature**. Wind River's formulas do not need refrigeration or storage at a specific temperature. Our microbes have survived storage below freezing temperatures and up to approximately 130 degrees Fahrenheit without a loss of viability. As with any microbial inoculants, they require storage away from direct sunlight.

5. **Shelf-life**. Most microbial inoculants can last for 3-12 months if stored properly. However, Wind River Microbes is proud to announce that our solutions have remained effective for over 12 years. Even after all this time, the viability of our solutions has only decreased by 0.024 percent. We have tested the same solutions annually since 2012 to ensure their function and viability, and they have not degraded when stored out of direct sunlight, between 50-85°F.

6. **Feed**. Many other formulas require maintenance such as feeding, to keep the species alive - ours do not. Once our formulation is complete, we induce dormancy so the microbes "wake up" when they encounter a food source, which is derived within soil structures, or digestive systems.

7. **Tank-Mixing**. Many competitor formulas should not be tank-mixed with fertilizers or chemicals. Ours can be safely tank-mixed while maintaining efficacy, as long as the mix is sprayed promptly and not allowed to sit in solution for more than 72 hours. Fungicides are the only chemical that should not be used with our formulas. *

*Please visit our website to access the tank mixing chart for detailed information.

www.windrivermicrobes.com

L&C NATURAL AG
OF NATURE, BY NATURE, FOR NATURE

American Grassfed©

JOHN DEERE FINANCIAL

JOHN DEERE FINANCIAL

American Grassfed®

L&L

2024

NATURAL AG

OF NATURE, BY NATURE, FOR NATURE

410-476-1495