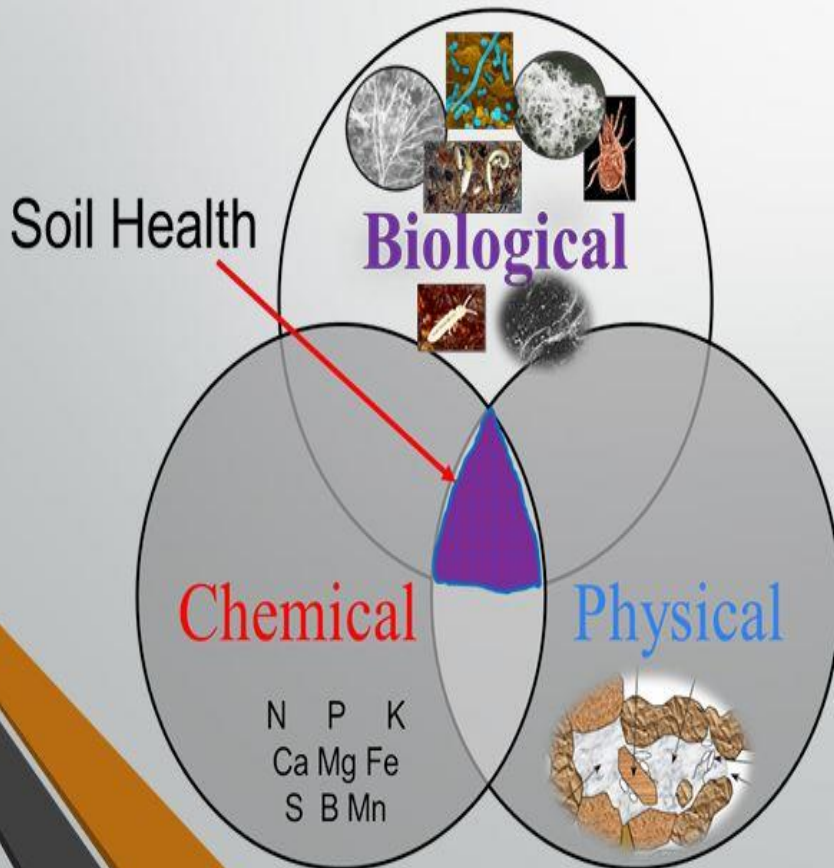


IMPROVING SOIL HEALTH TO REDUCE NUTRIENT LOADINGS - MIKE PAULUS, PRESIDENT, CLEAN FARM FAMILIES

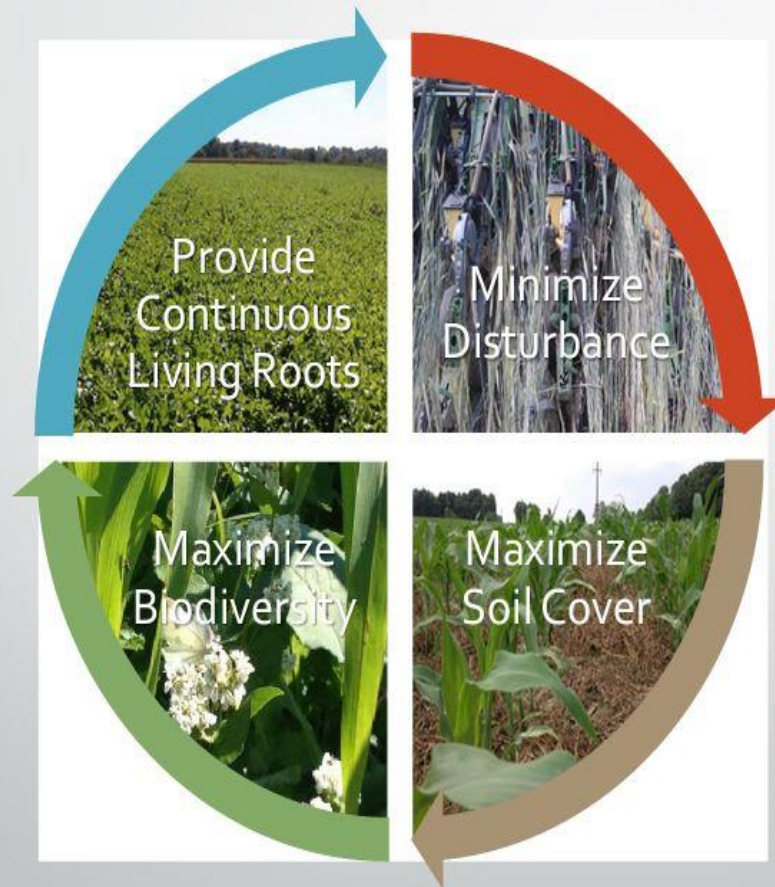


What is Soil Health?

The continued capacity of a soil to function as a vital, living ecosystem that sustains plants, animals, and humans (NRCS, 2015).



Soil Health Principles & Soil Function



Three basic concepts.....

1. The Soil is Alive!
2. Understand Relationship
(connectedness)-All is one!
3. Mimic Nature and the Natural
Processes
(water cycle, nutrient cycle, solar
energy)



Don't treat me like dirt! I am a life!!



**Water bears-
toughest
creature on
earth**

25 percent of all biodiversity is under the soil!!

MICROBIAL BIOMASS

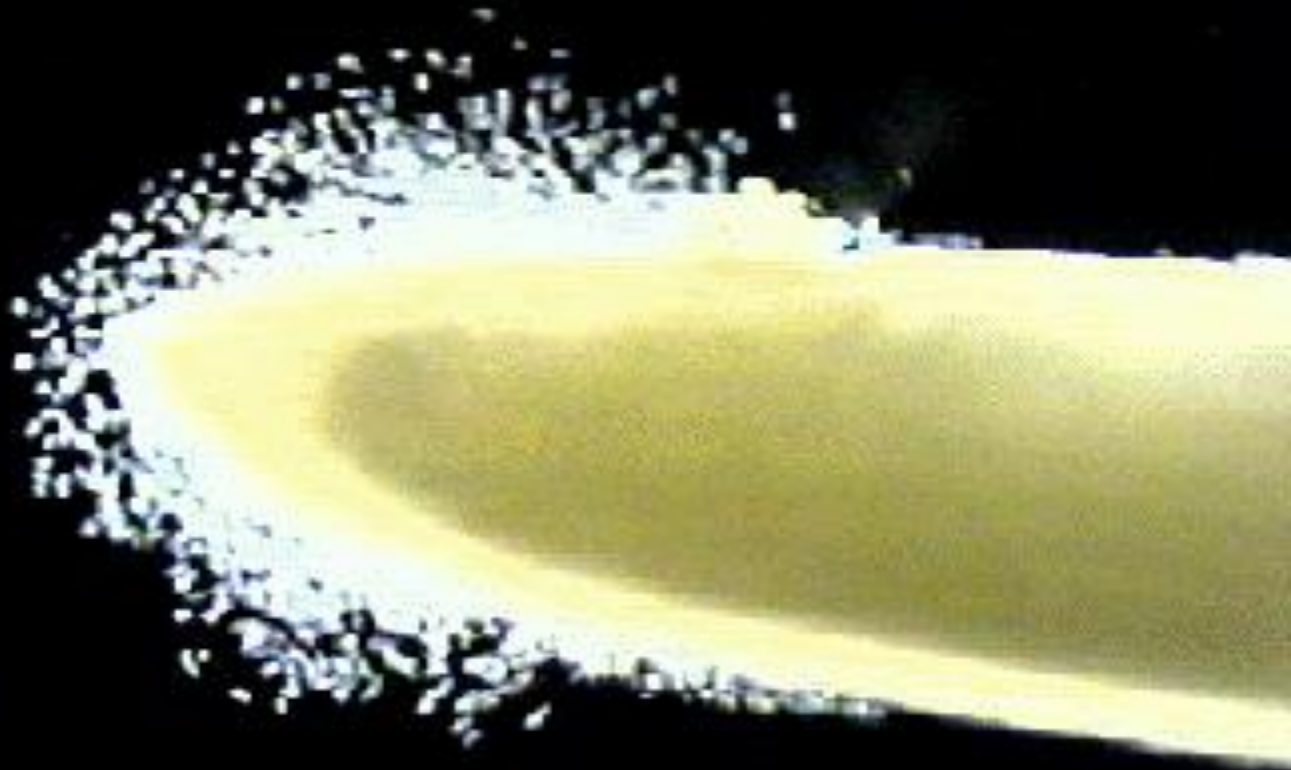


A pair of hands is shown from the chest up, cupping a small green seedling with three leaves and a small amount of dark soil. The background is black, decorated with numerous small, glowing green leaves falling from the top. The overall mood is one of care and environmental stewardship.

Plant and Soil are One

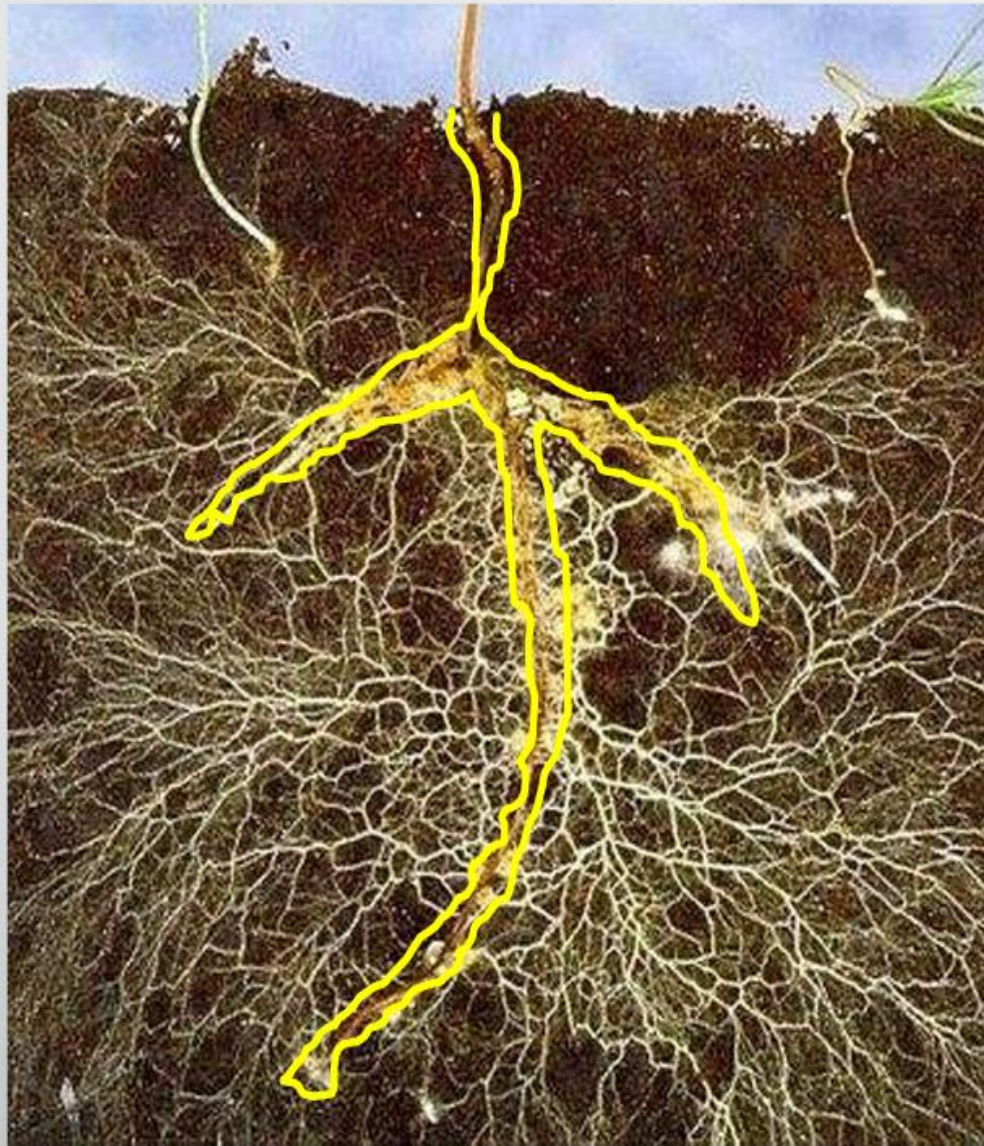
Ray Archuleta

Liquid Sun: Roots leaking exudates!



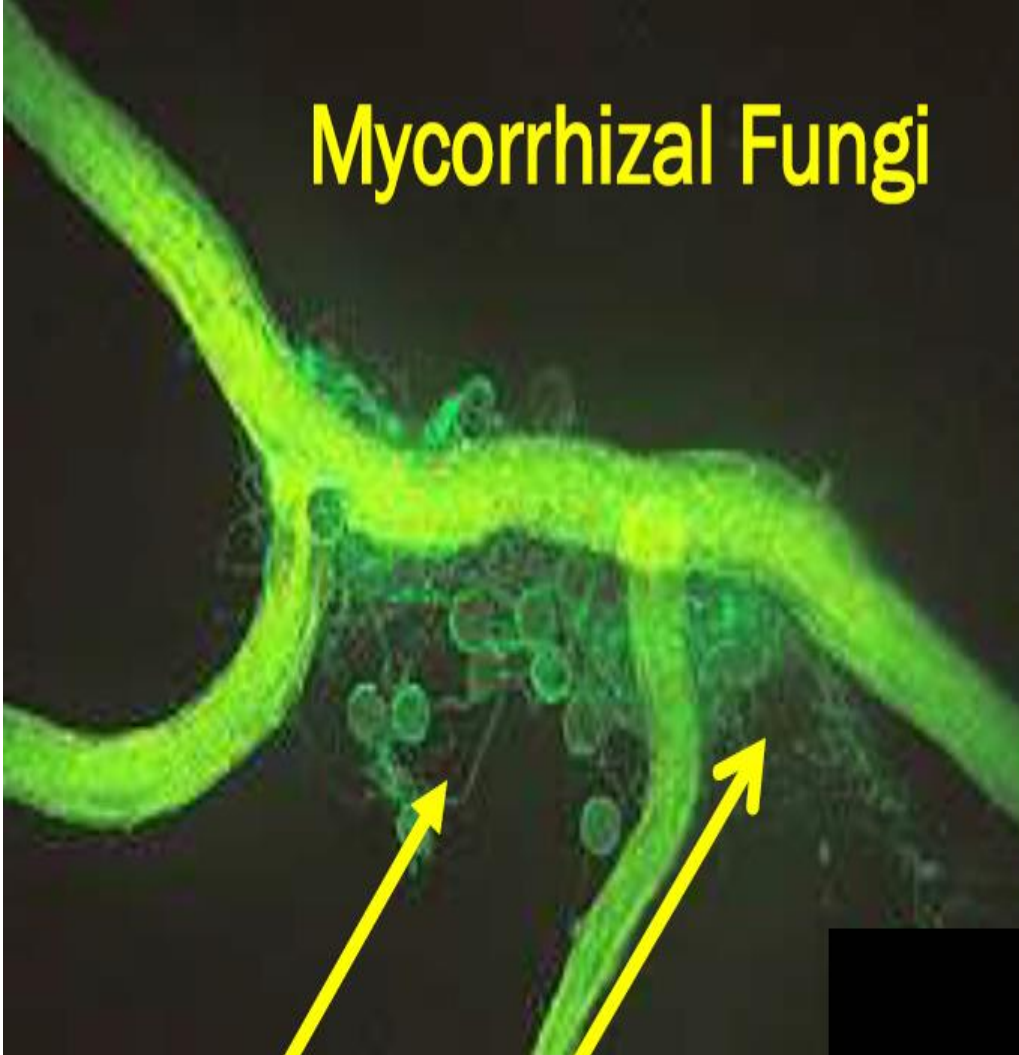
DIVERSITY: Optimizing Solar Energy Collection





Mycorrhizal hyphae network extending the root zone of a cover crop: the crop provides sugar energy from sun light; the hyphae mines water and minerals for the cover crop.

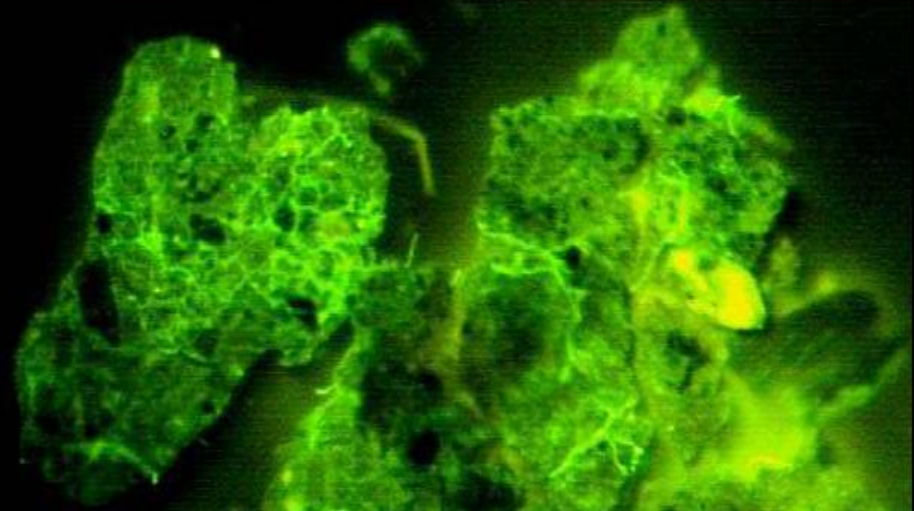
Mycorrhizal Fungi



Glomalin is naturally brown. A laboratory procedure reveals glomalin on hyphae and soil aggregates as the bright green material shown here.



Fungal Hyphae



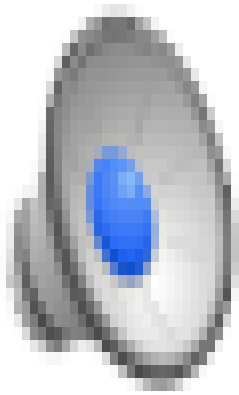


**This soil is naked, hungry, thirsty
and running a fever!**

Ray Archuleta 2007

Cropping Systems

No Relationship



Relationship



Healthy Soil

- Clean Water
- Clean Air
- Healthy Plant
- Healthy Animal
- Healthy People 😊

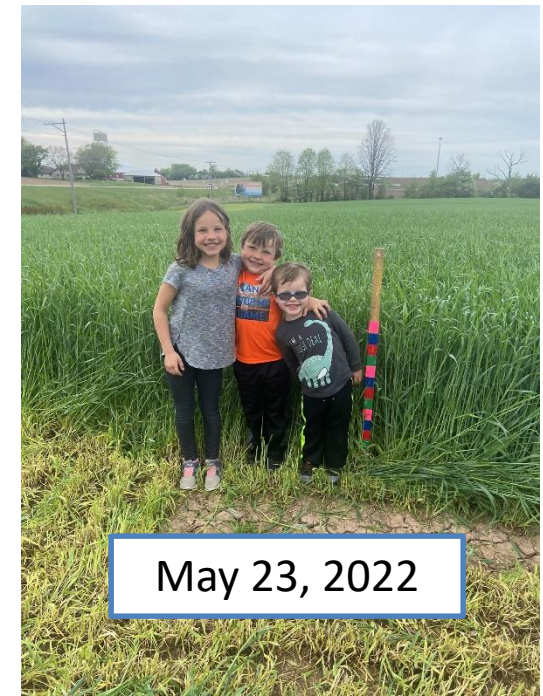
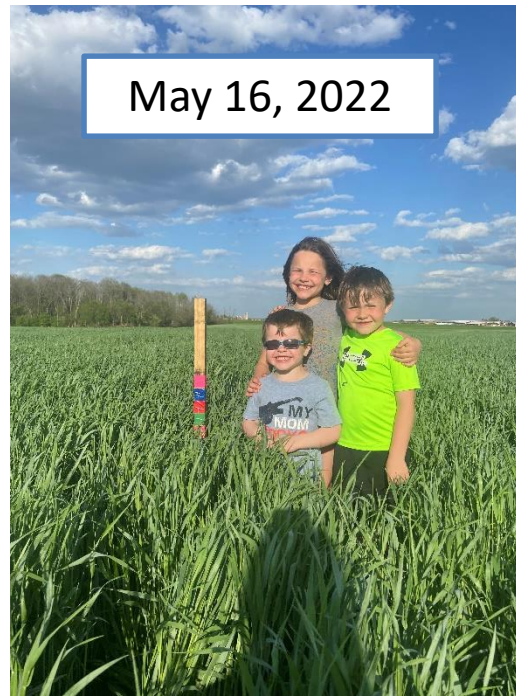
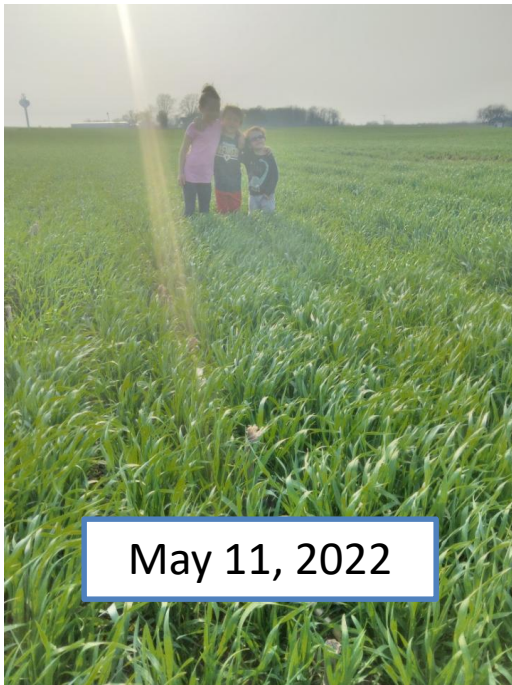


Improving Soil Health and Water Quality

Mike Paulus – CFF Chairman

Paulus Dairy

- Paulus Dairy is a family run CAFO Dairy farm- milking 1,700 cows and operating over 2,000 acres of cropland.
- Raise alfalfa, soybeans, winter wheat, corn grain, corn silage, winter rye forage and grain, and various cover crop mixes
 - Winter Rye is a popular cover crop choice due to its relatively quick establishment and growth, and dual use as feed



Paulus Dairy

- Plant winter rye in the fall after corn silage harvest, and surface apply manure to establish a healthy stand and soil cover going into winter
- We use low disturbance manure applications on all fields



Paulus Dairy Cover Crop



Clean Farm Families 2022 Board Members



Clean Farm Families Goals

Educate landowners and farmers on ways to improve their farms profitability and resiliency through their soil health

Promote soil health and water conservation practices through incentive payments

Research the multiple benefits of No-Till and Cover Crops effectiveness in achieving high yields as well as soil health and better water infiltration at local plots, including our Soil Health Demonstration Plot in Fredonia.





2022 SOIL HEALTH INCENTIVES CLEAN FARM FAMILIES

Ozaukee County Land & Water and the Clean Farm Families

will again offer incentives to farmers looking to improve their soil health, lower input costs and increase farm profitability.

These incentives are offered to qualifying landowners in the Clean Farm Families Project Area which is county wide. All reimbursements for implemented practices will be paid in December 2022 upon completion of the practice.

NEW to 2022!

Planting Green

Establish Grazing

Equipment Conversion Costs

Nutrient Testing

TO SIGN-UP CONTACT KATIE VOGELER

121 W. Main St.
Po Box 994
Port Washington, WI 53074
262-483-9740

kvogeler@co.ozaukee.wi.us

<i>Soil Health Incentives</i>	<i>Rate</i>
No-Till 1st year	\$20.00 / ac
No-Till 2nd year	\$35.00 / ac
Cover Crop 1st year	\$35.00 / ac
Cover Crop 2nd year	\$45.00 / ac
Low disturbance manure app	\$50.00 / hour
Harvestable Buffer	\$450.00 / ac
NEW	
Planting Green	\$35.00 / ac
Grazing	\$3,000 stipend
Equipment Conversion	\$2,000 stipend
Nutrient Testing	\$100.00 / test

For More Info, Contact Katie Vogeler

262-483-9740 or kvogeler@co.ozaukee.wi.us

NEW TO 2022!

QUALIFYING PARTICIPANTS CAN RECEIVE UP TO \$3,000 PER GROWER, PER YEAR. THERE IS A THREE-YEAR CAP ON PRACTICES, PER FIELD.

THE NEW GRAZING PRACTICE MAY INCLUDE COSTS LIKE: FENCING, WATER SYSTEMS, SEED ETC., TO CONVERT SUITABLE AREAS TO LONGTERM PASTURE.

THE EQUIPMENT CONVERSION STIPEND MUST BE USED TO UPDATE EXISTING AG IMPLEMENTS TO THAT OF LESSER SOIL DISTURBANCE, RECEIPTS AND PHOTOS MUST BE SUBMITTED.

NUTRIENT TESTING MAY INCLUDE: FORAGE, MANURE, PSNT, TISSUE AND BIOMASS. RESULTS AND RECEIPTS MUST BE SUBMITTED.

CFF Outreach

As a leading Producer-Led Watershed group in Southeast Wisconsin, they provide a platform for producers and landowners to share ideas, concerns and lessons learned when it comes to farming and protecting our natural resources. With over 40 growers participating annually, we look forward to the growth of this program and the benefits it brings to the soil. Join us at our dates below for all the results behind our soil health research!

2023 Date
TBD

Cover Crop Demonstration Plot
On Hwy 57, south of Fredonia.
Registration required

Pop-Up Plot Days

Visit the [Clean Farm Families website](#) for updated scheduling
TBD!





Ray Archuleta 2017 Winter
2018 Winter
2018 Fall



Steve Groff 2019



Russel Hedrick 2020
Rick Clark 2021

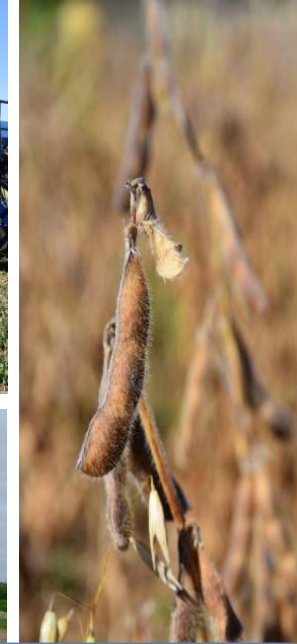


Gabe Brown 2022

Our February Soil Health Workshops feature Nationally Recognized Soil Health Presenters



Ray Archuleta – Fall 2018 Soil Health Workshop



Proud to be an
**AGRICULTURAL
OBSERVATION
STEWARD**

LOTS OF SOIL HEALTH FIELD DAYS





BEHOLD
OUR *living*
SOIL

R
Co
Lea
MAY 2014



WARNING

Avoid injury from falling marker.
1. Secure marker in upright position with marker backing away for transportation, service or storage.
2. Do not operate until all warning horns are fully checked with the engine running.
3. Check marker stability during raising and lowering.

**Feeder
LOGIES**

WARNING
MOVING PARTS
HAZARD
Avoid Serious Injury or Death:
Keep hands, feet, hair and
clothing away from moving parts
and do not climb on machine
while running.

FUNDED BY
**Fund For Lake Michigan
and Ozaukee County**
 **Fund for
Lake Michigan**
Clearly making a deep impact.
 **OZAUKEE
COUNTY**

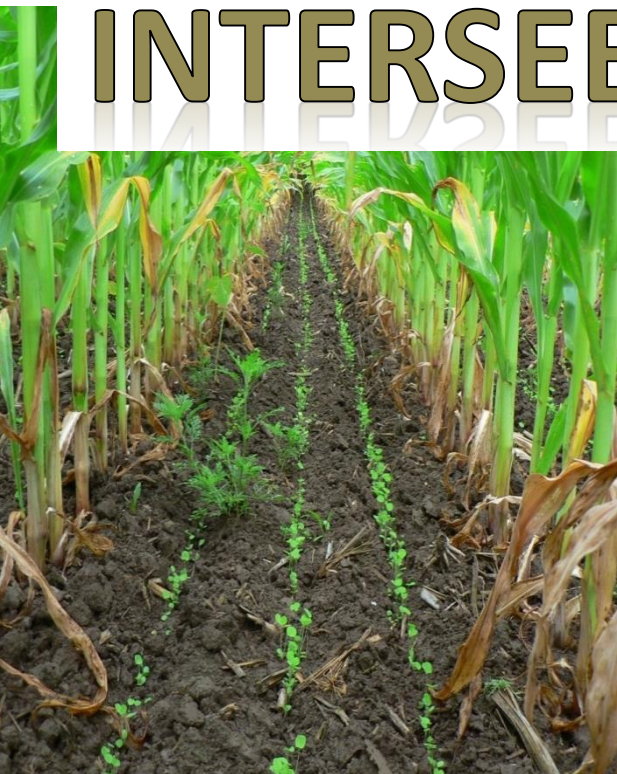
FARMERS IMPLEMENT
www.firworld.com

W
**WISCONSIN
FARMERS**

140



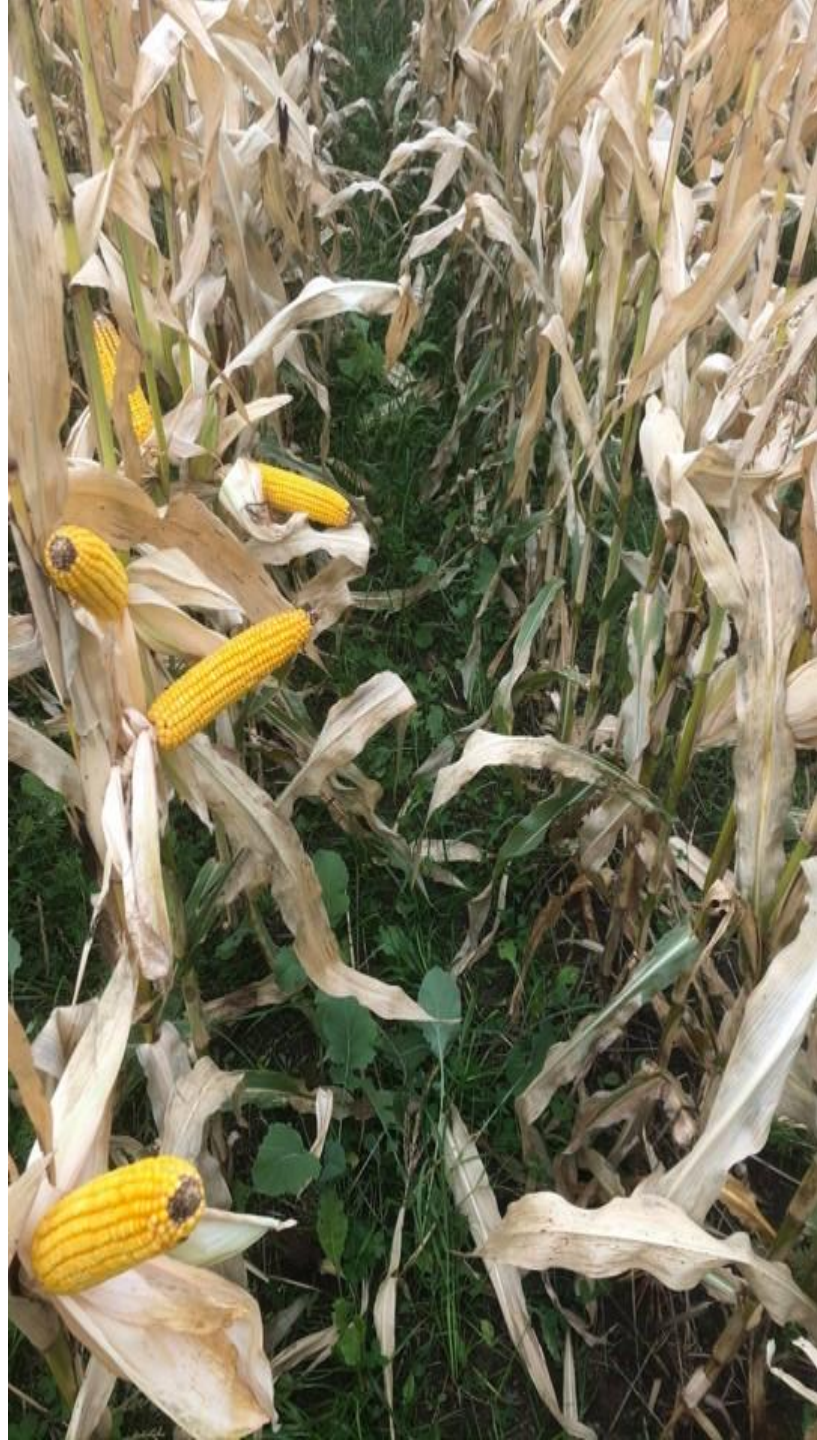
INTERSEEDING COVER CROPS



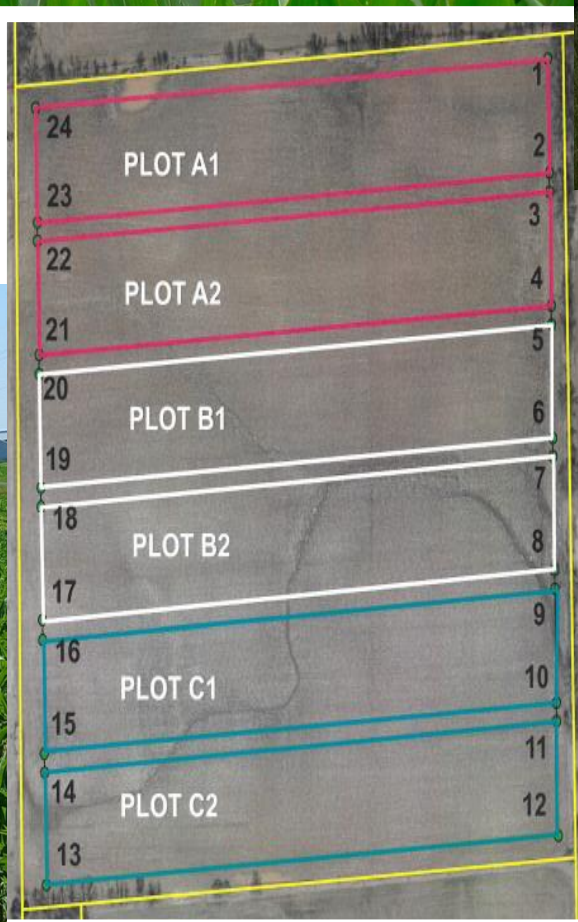
Current Research:

- Cinto Bean for added protein in feed
- Affect Cover Crops and No-Till have on Soil Health and Water infiltration





COVER CROP DEMONSTRATION PLOT



Installing Temperature Data Loggers



Planting Green – No-till into a rye cover crop



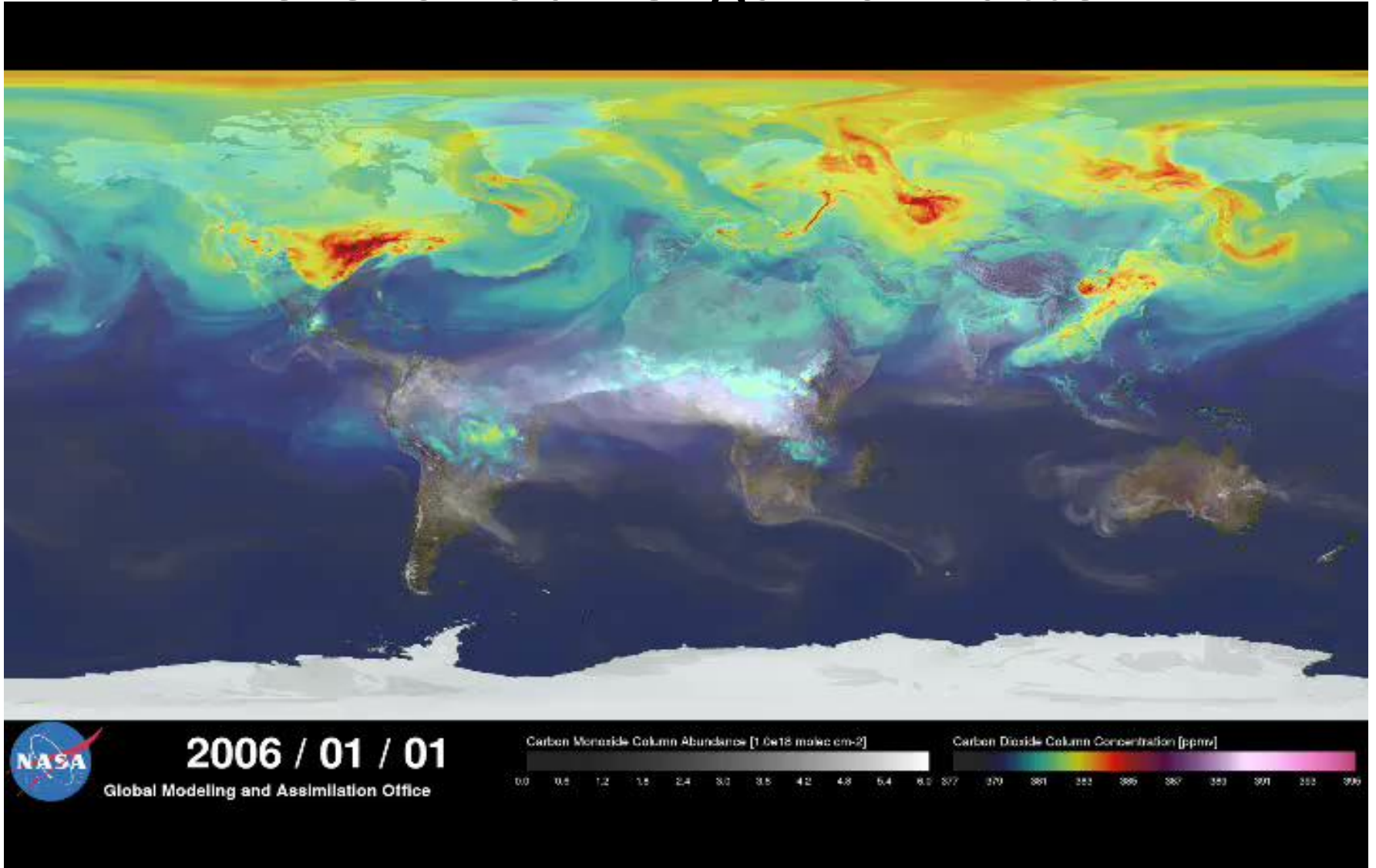
Low Disturbance Manure Applicator



▶ Play Video



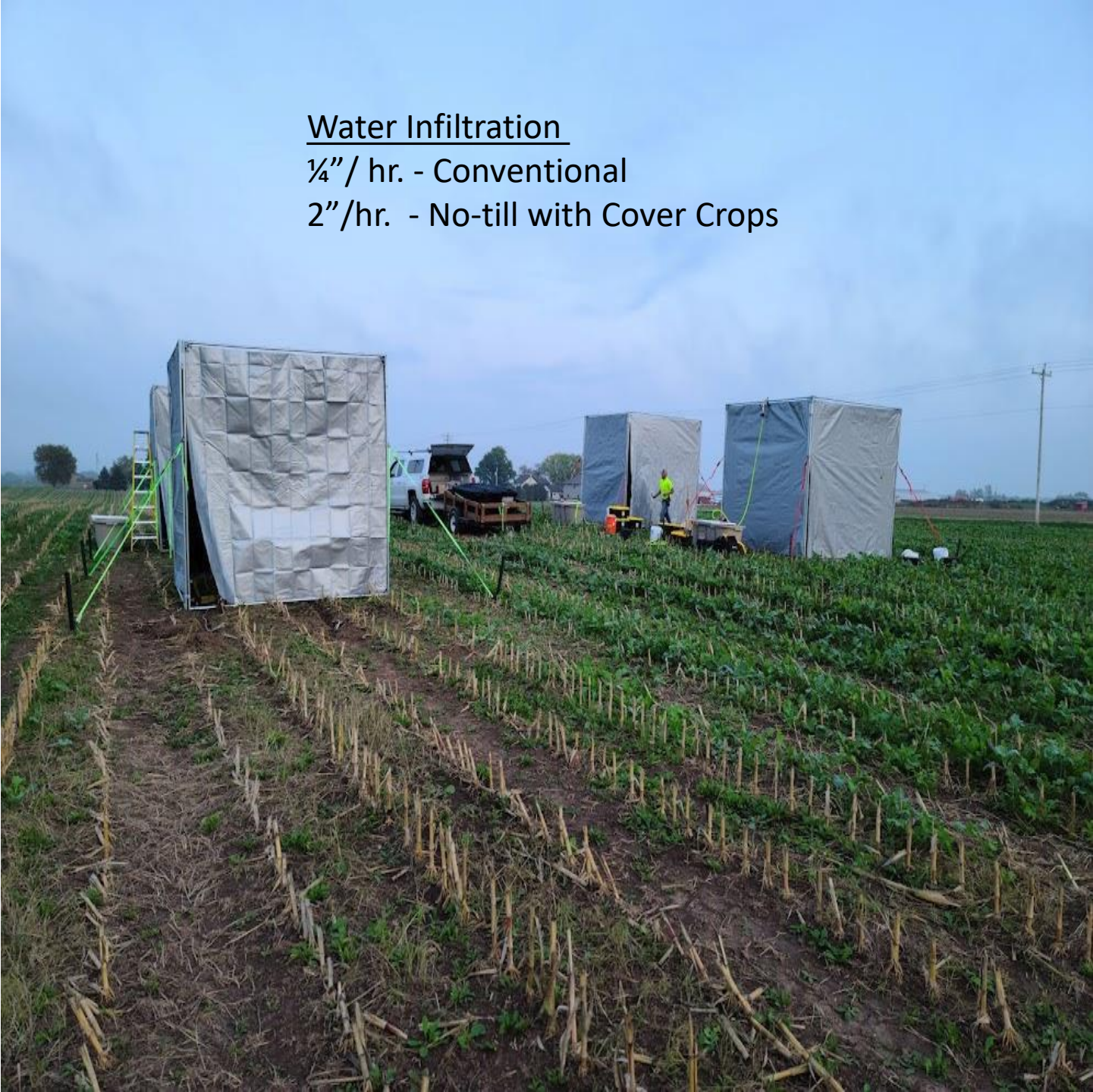
Where is Your Organic Matter?



Water Infiltration

¼" / hr. - Conventional

2" / hr. - No-till with Cover Crops



Phosphorus & Soil Savings Examples

- **Dairy farm with a corn silage, soybean and alfalfa rotation adopting 170 acres of small grain cover crops following corn silage and soybeans**
Phosphorus loss reduction: 182 pounds
Soil erosion reduction: 213 tons
- **Corn/soybean farm adopting 165 acres of strip-tillage**
Phosphorus loss reduction: 322 pounds
Soil erosion reduction: 330 tons
- **Corn/soybean/winter wheat farm adopting 264 acres of no-tillage**
Phosphorus loss reduction: 378 pounds
Soil erosion reduction: 401 tons

Example of an 18 ton soil loss in our Plot with tillage and without a cover crop. This was after a 4 inch rain event. The No-Till Plot soil remained in tact and in the field.



Adaptive Mgmt. Opportunities



ECONOMICS OF SOIL HEALTH SYSTEMS ON 100 FARMS



A Comprehensive Evaluation Across Nine States

Net Income:

Corn + \$51.60/acre

Soybeans + \$44.89/acre

Funding:



Natural Resources Conservation Service

Conservation in Ozaukee Led by Farmers, Done by Farmers





Questions

Thank you!

Please Visit CleanFarmFamilies.com