2020 No-Till & Cover Crop Symposium

February 26, 2020
Burlington, VT

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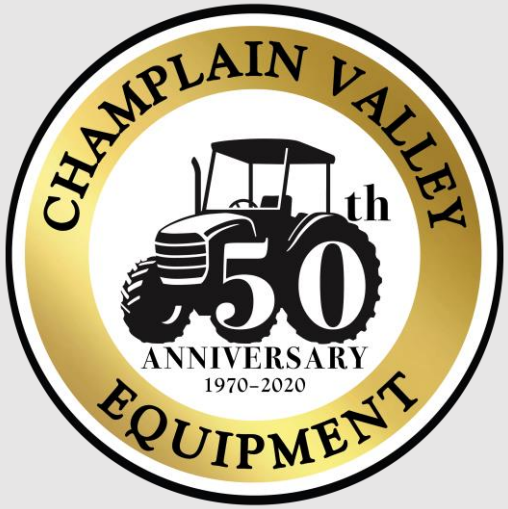

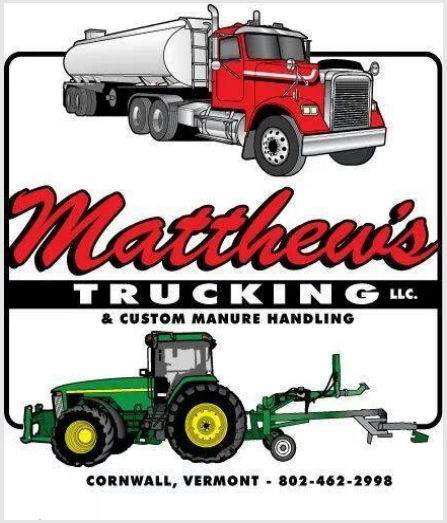

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Putting Soil Health to Work

David Brandt

is a long-time no-tiller (1971) and cover crops (1978). He farms over 1,150 acres in Carroll, Ohio.

He will share how his cropping systems are powered by soil health and what that means for saving money on inputs while maintaining yields.

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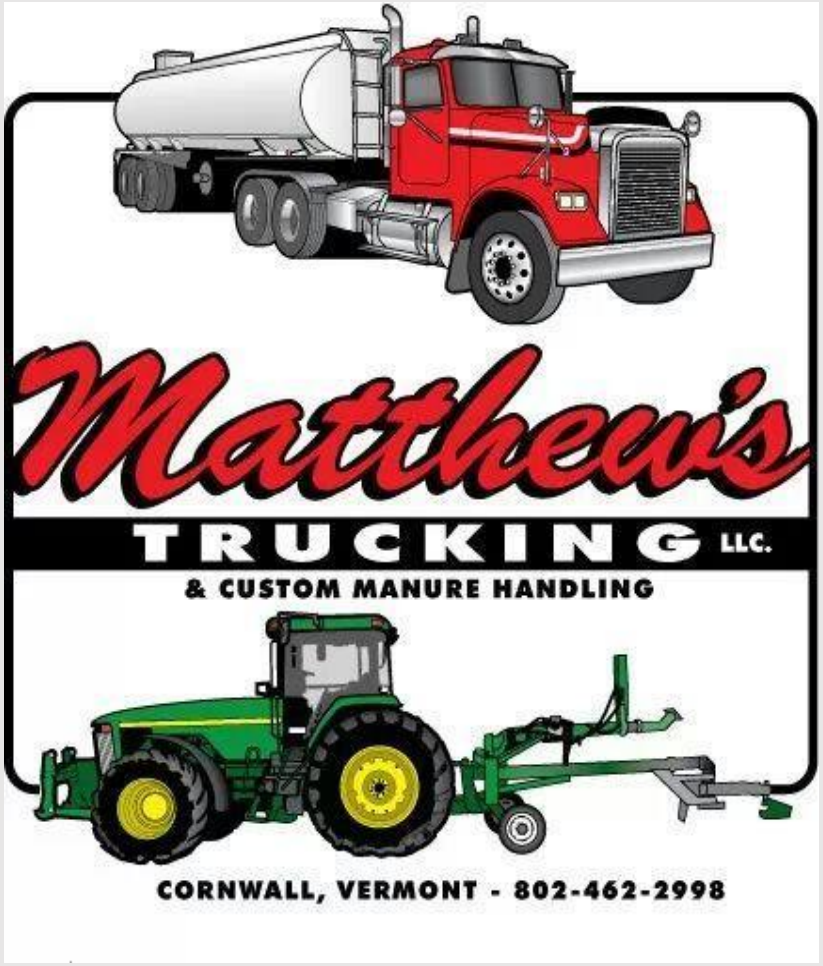

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Hear how some of the Northeast's progressive farmers meet the challenges of a no-till cover cropped system.

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Cropping Systems for Conservation Agriculture - Research Results and Future Projects

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UVM Extension - Middlebury

Kirsten Workman

works with farmers to implement practices that improve crop production and protect water quality in her role with UVM Extension's Champlain Valley Crop, Soil & Pasture Team.

Economics, Profitability and Tracking the Right Metrics - Case Studies & Tools

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UVM Extension Farm Business

Betsy Miller

Farm management educator for UVM Extension Farm Viabilty Program to assist farms in completing Business Management Plans, enterprise analysis and farm transfer.

Economics, Profitability and Tracking the Right Metrics - Case Studies & Tools

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UVM Extension - Middlebury

Jeff Carter

UVM Extension Ag Agent in Middlebury helps farmers with Field Crop Production, Water Quality and the Champlain Valley Farmer Coalition.

Where are we headed with No-Till and Cover Crops in Vermont

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Where are we Headed with No-Till Corn ?

Jeff Carter
UVM Extension
Middlebury, VT

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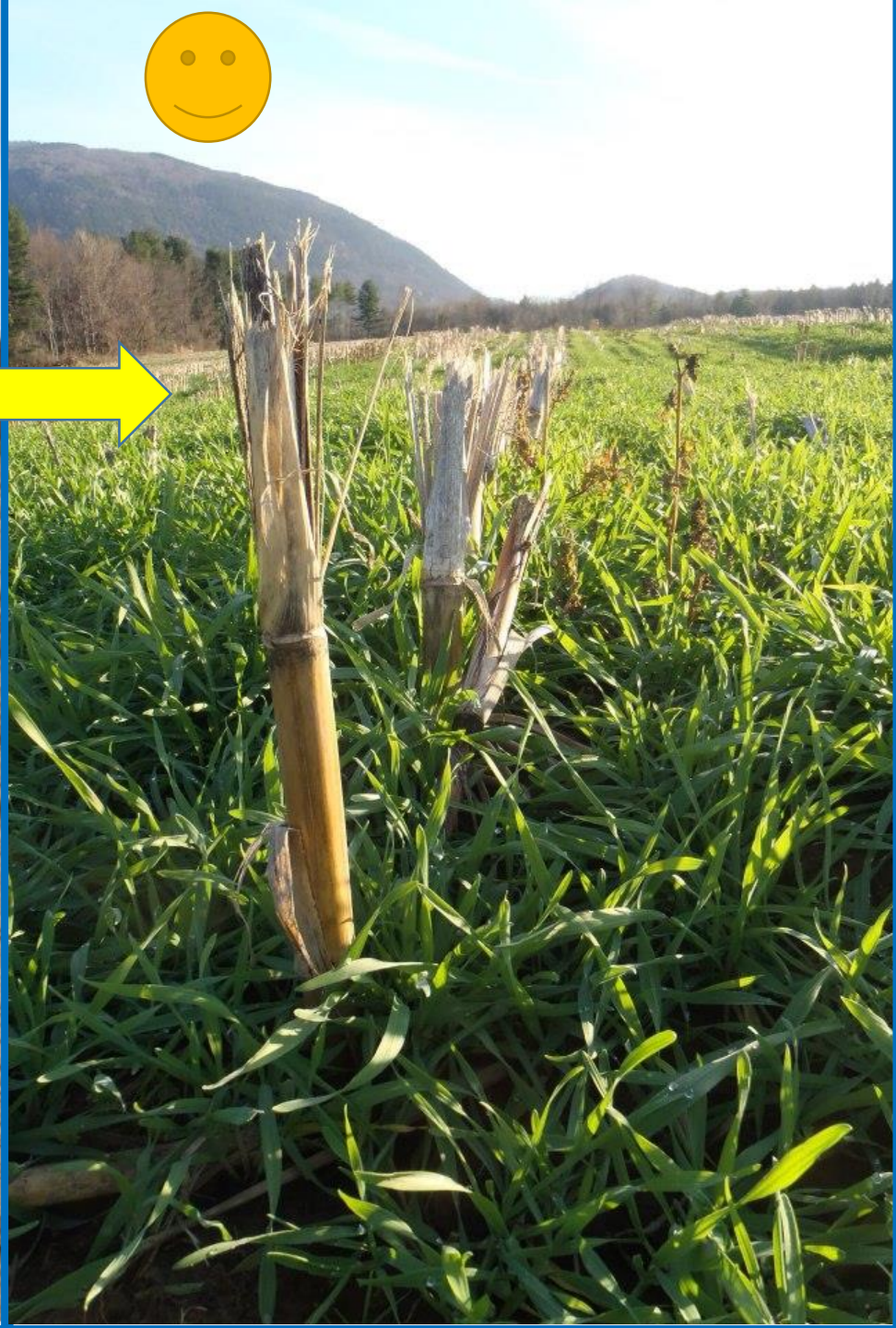
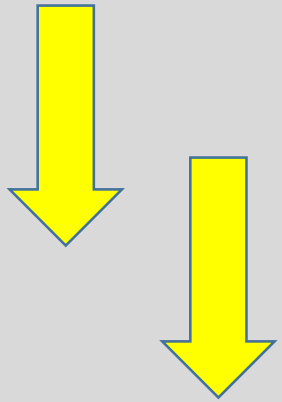
A Good Direction



- Input Cost $$
- Production Risk



- Organic Matter
- Crop Yield $$

Making Money or Taking Money ?

Equipment +/-

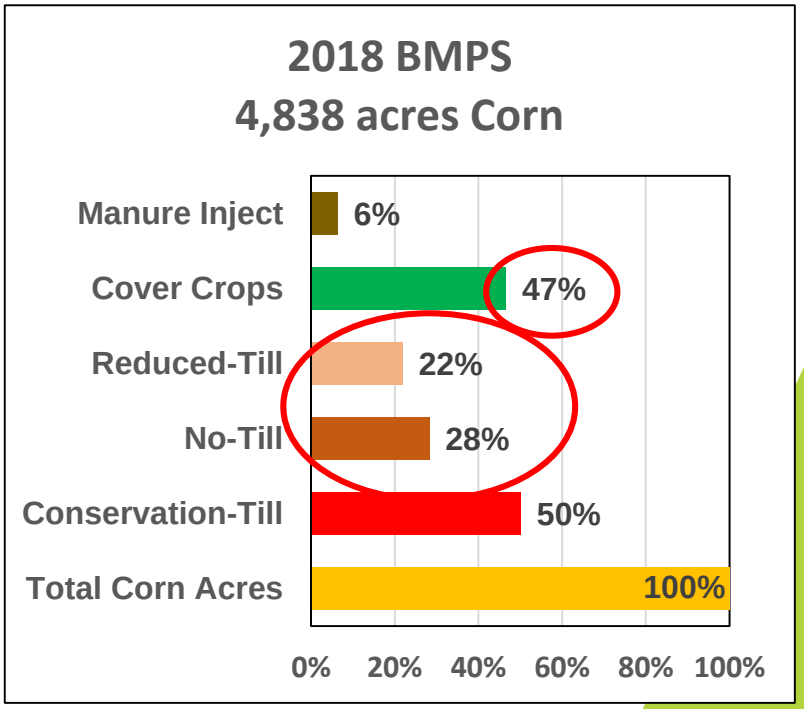
Labor +/-

Fuel -/-

Inputs +/-

Crop Yield -/+

Adoption Rate by Farmers?



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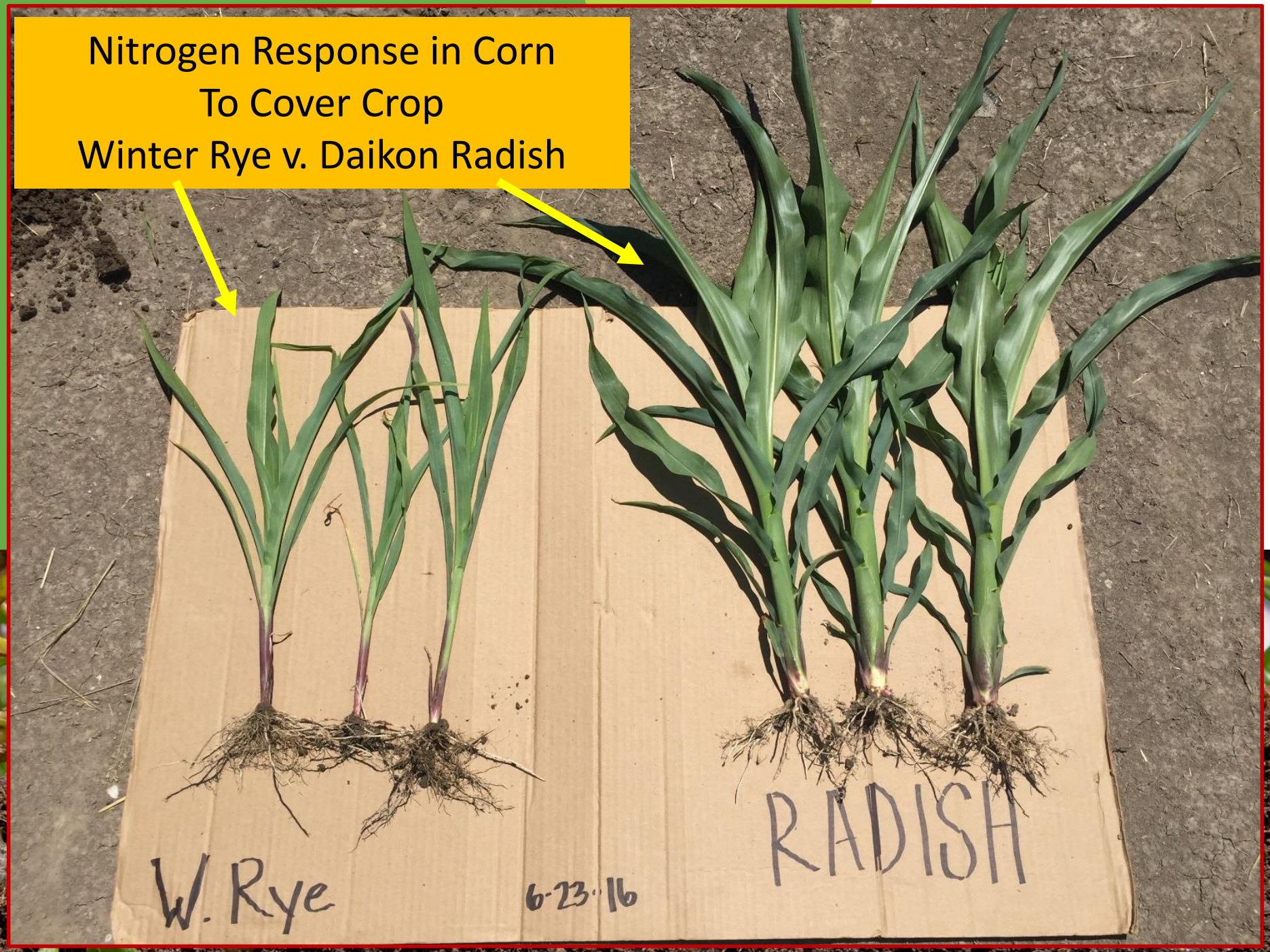
Nitrogen Response in Corn
To Cover Crop
Winter Rye v. Daikon Radish
W. Rye
6-23-16
RADISH

What Value $$ For Soil Health ?

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What Value $$

For Soil Health ?

Water Infiltration – Save soil, N,P

Root Depth Available – Yield $$

Soil Water Available - Drought

Plant Nutrients Available $

Organic Matter - N, Carbon, PES

Biological Diversity - Soil Organisms

Soil Aggregate Structure

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What Value $$ For a Cover Crop ?

“I Get a Great Cover Crop EVERY YEAR ”

Do you use Cover Crops for different $$ Income

Organic Matter & Soil Carbon - PES

Fix Nitrogen - Early Mixes

Graze w/ Livestock – Late fall, Before corn

Lease for mob spring grazing

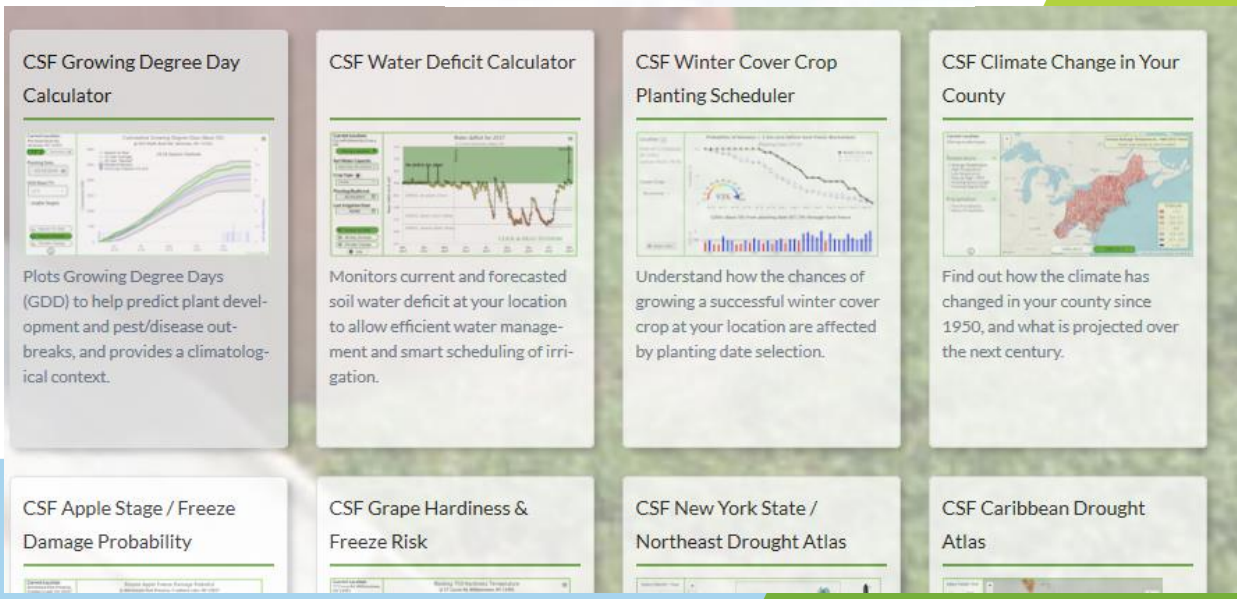
Sell - Seed and Straw

Reduce Risk to Farm in Vermont

Climate Risk & GDD Probabilities

- **Optimize Crop Value**
- **Weather**
- **Cost**
- **Decision Tools**

CSF
Climate Smart Farming
A program of Cornell University



Climate Smart Farming
A program of Cornell University

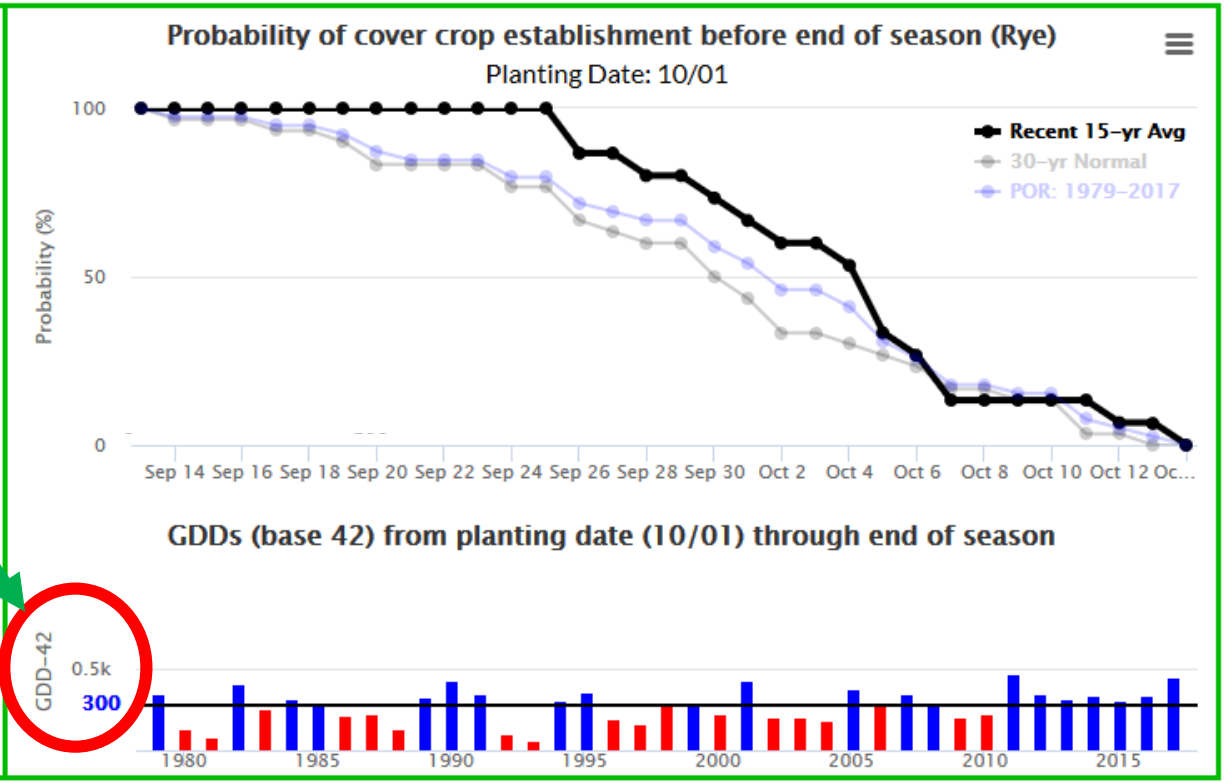
CSF Winter Cover Crop Planting Scheduler

Climate | Tools | Team | Resources | Videos

Current Location:
Middlebury, VT 05753
Lat/Lon: 44.02, -73.15
Change Location

Cover Crop
Rye

Info



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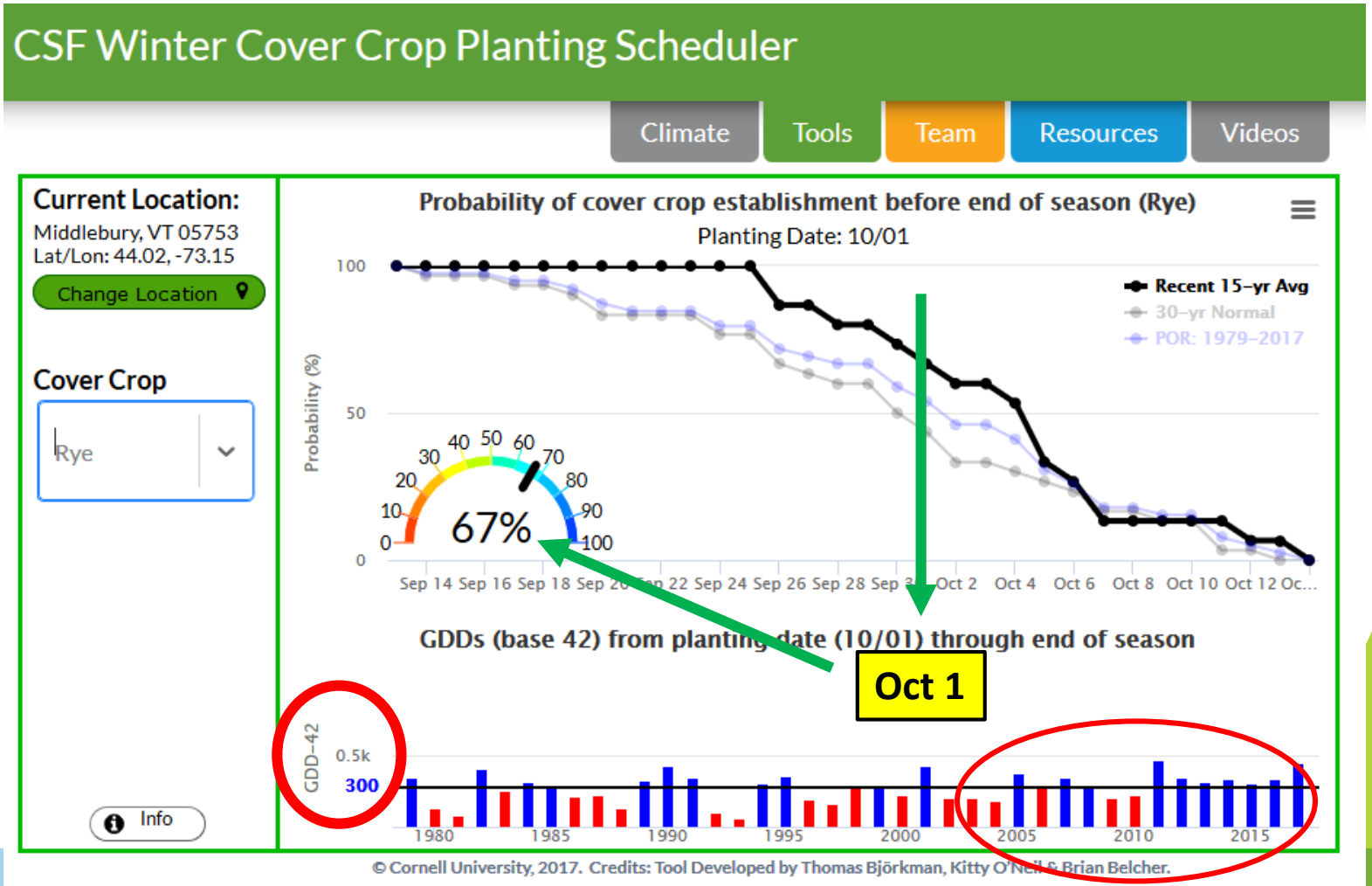
Middlebury, VT
300 GDD - 10 out of 15 Years



Middlebury, VT
300 GDD - 2 out of 15 Years

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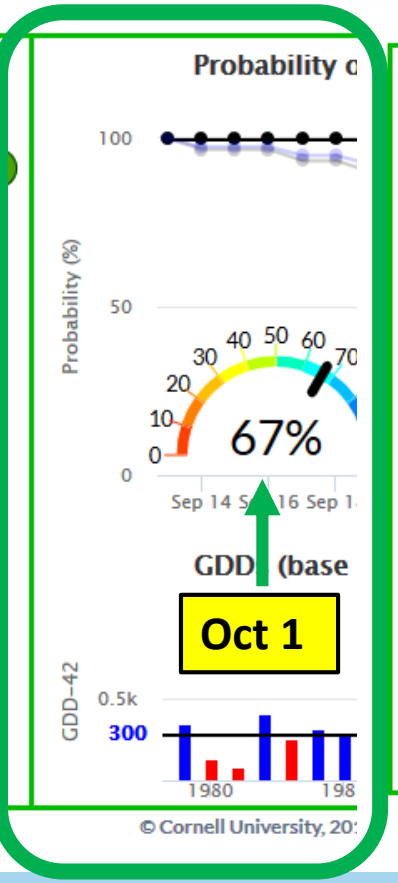

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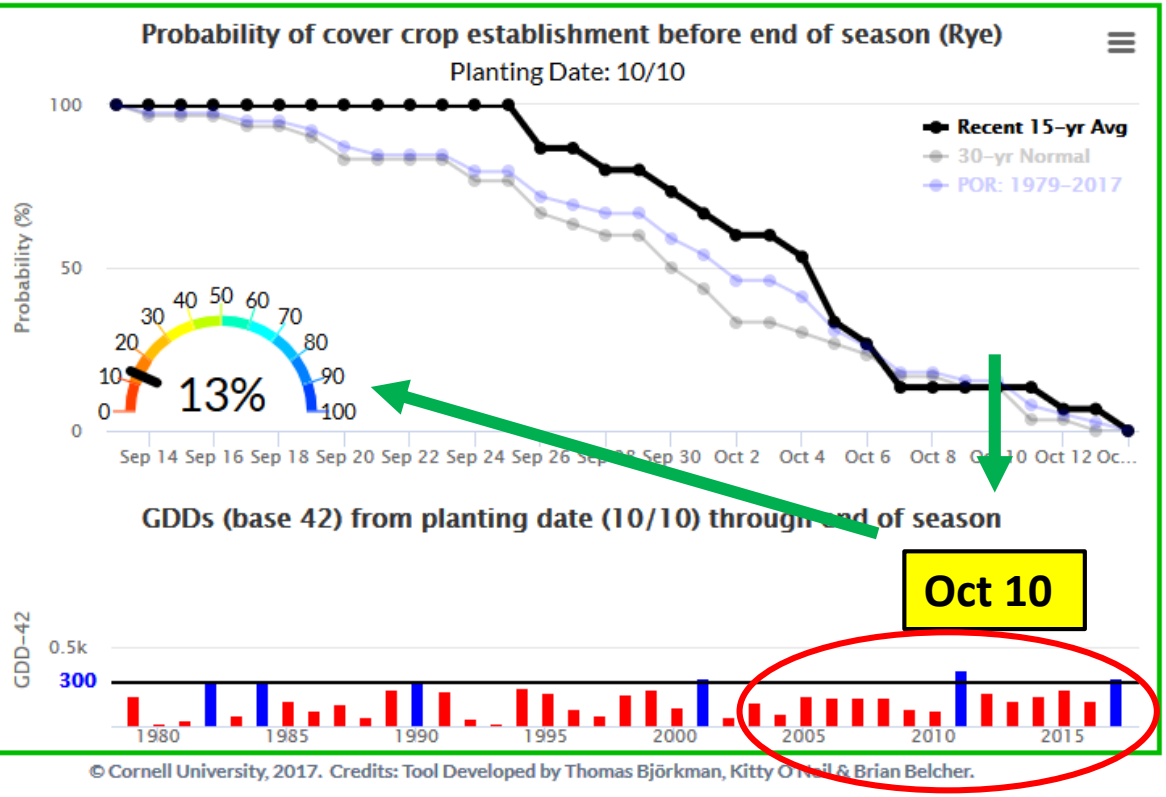

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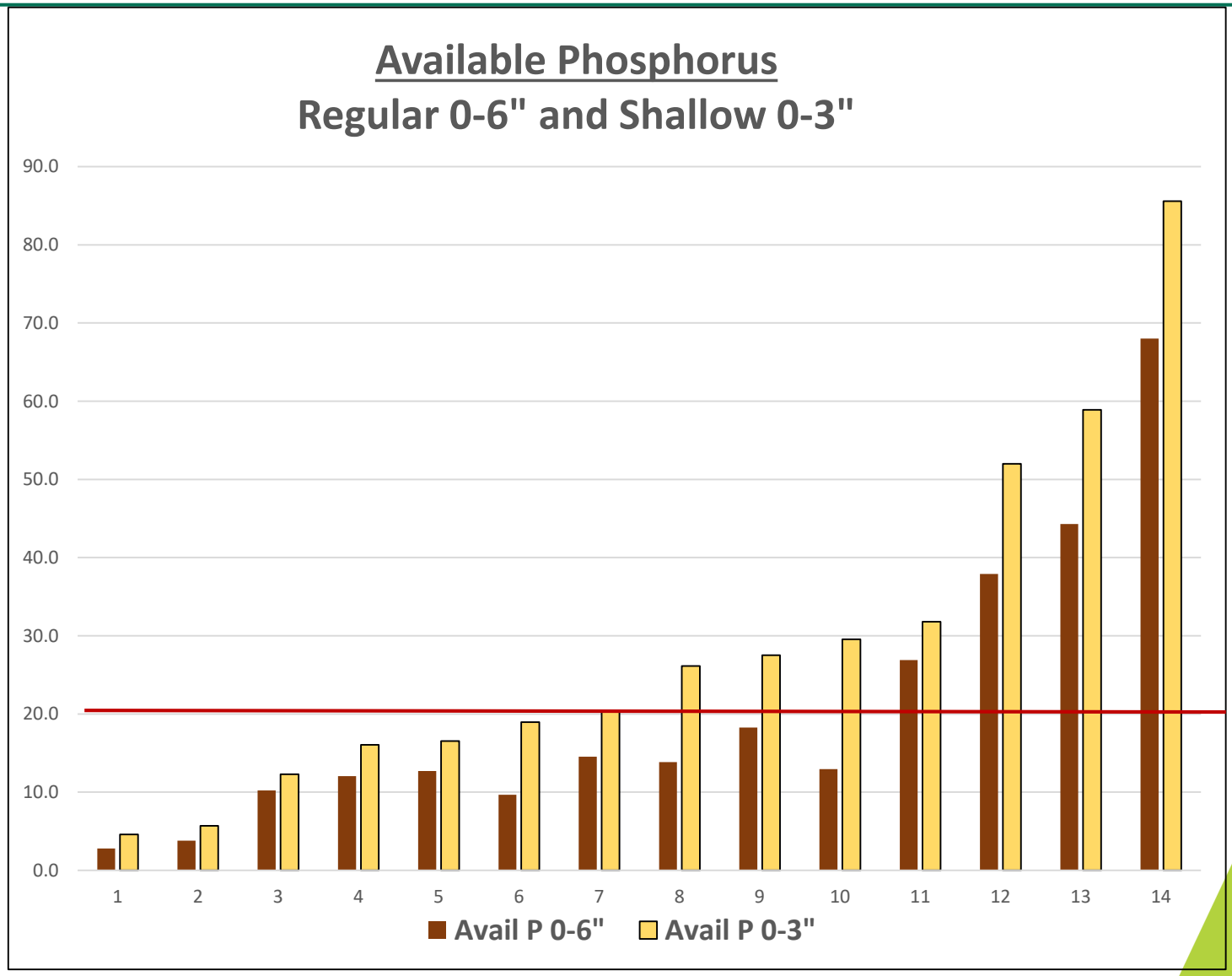
No-Till Challenges

High P Soils / P Stratification

Preferential Flow Paths in Soil

No-Till System Trade-offs

Is No-Till Increasing Soil Test P ?



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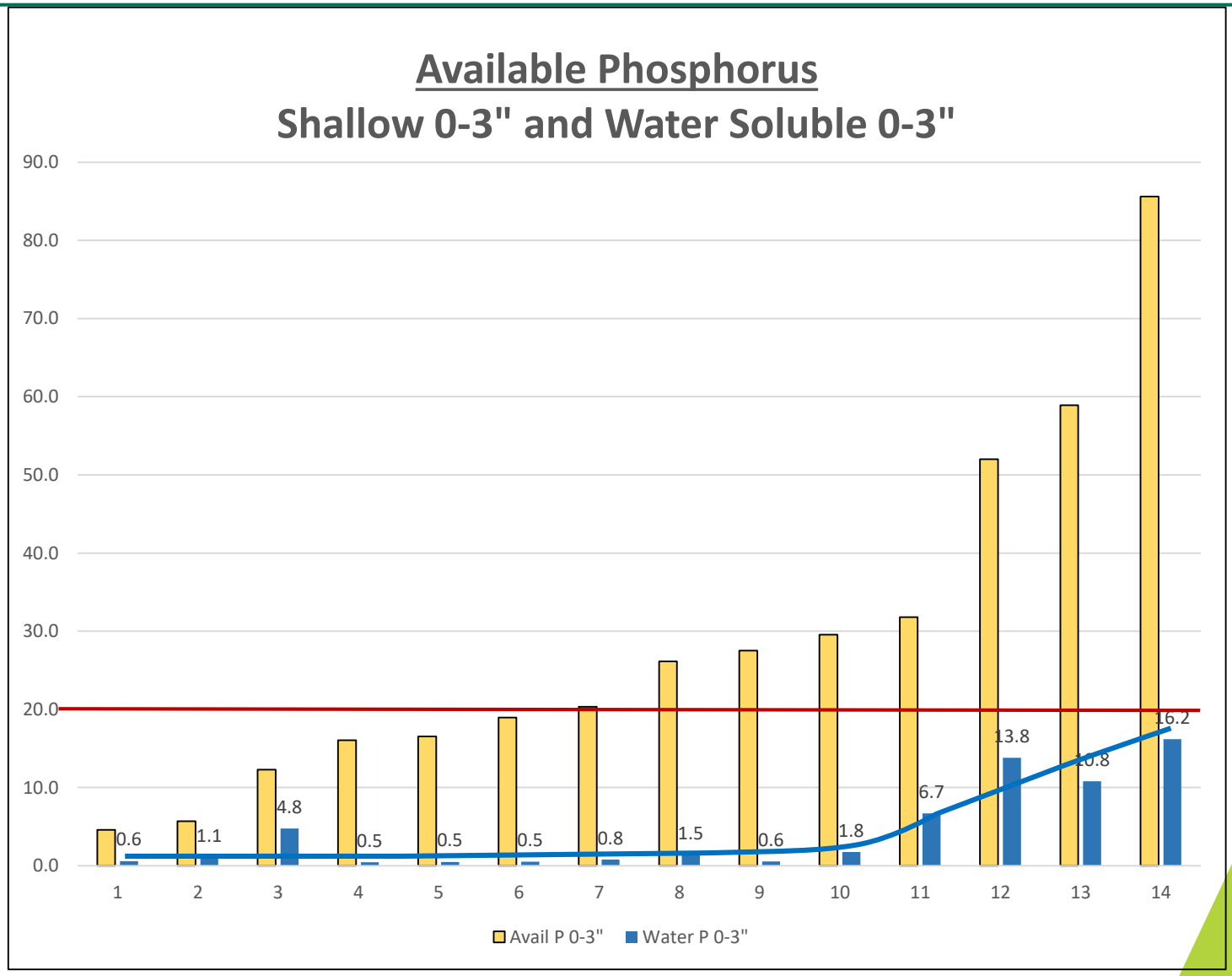
Water Soluble P at Soil Surface



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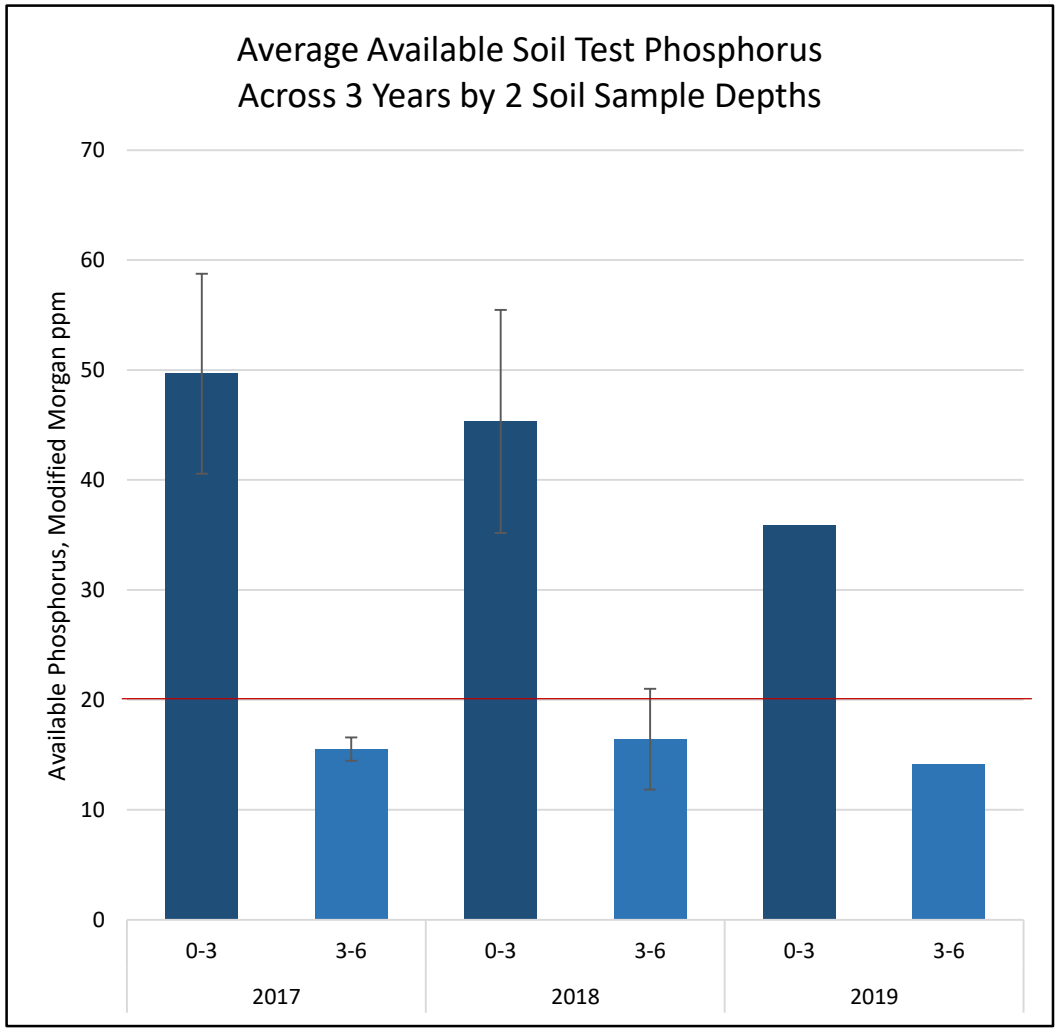
Does Gypsum Decrease Soil Test P ?

Improve Soil Health and Reduce Field Soil Test Phosphorus



<u>2017</u>
Preliminary Soil Tests

<u>Fall 2017 & Fall 2018</u>
Gypsum Materials Applied

- Flue Gas Gypsum (1,875 lb/ac)
- "Nutrisoft DG" (1,250 lb/ac)
- "Black Ag Gypsum DG" (625 lb/ac)

<u>2018 & 2019</u>
Soil Test Phosphorus - multi depths
Corn Crop - Yield & P recovery
Cover Crop - Yield & P recovery

<u>2019 - CASH Test</u>
Soil Health
Compaction
Infiltration

This material is based upon work supported by the Natural Resources Conservation Service, U.S. Department of Agriculture, under Vermont Conservation Innovation Grant number 69-1644-17-121

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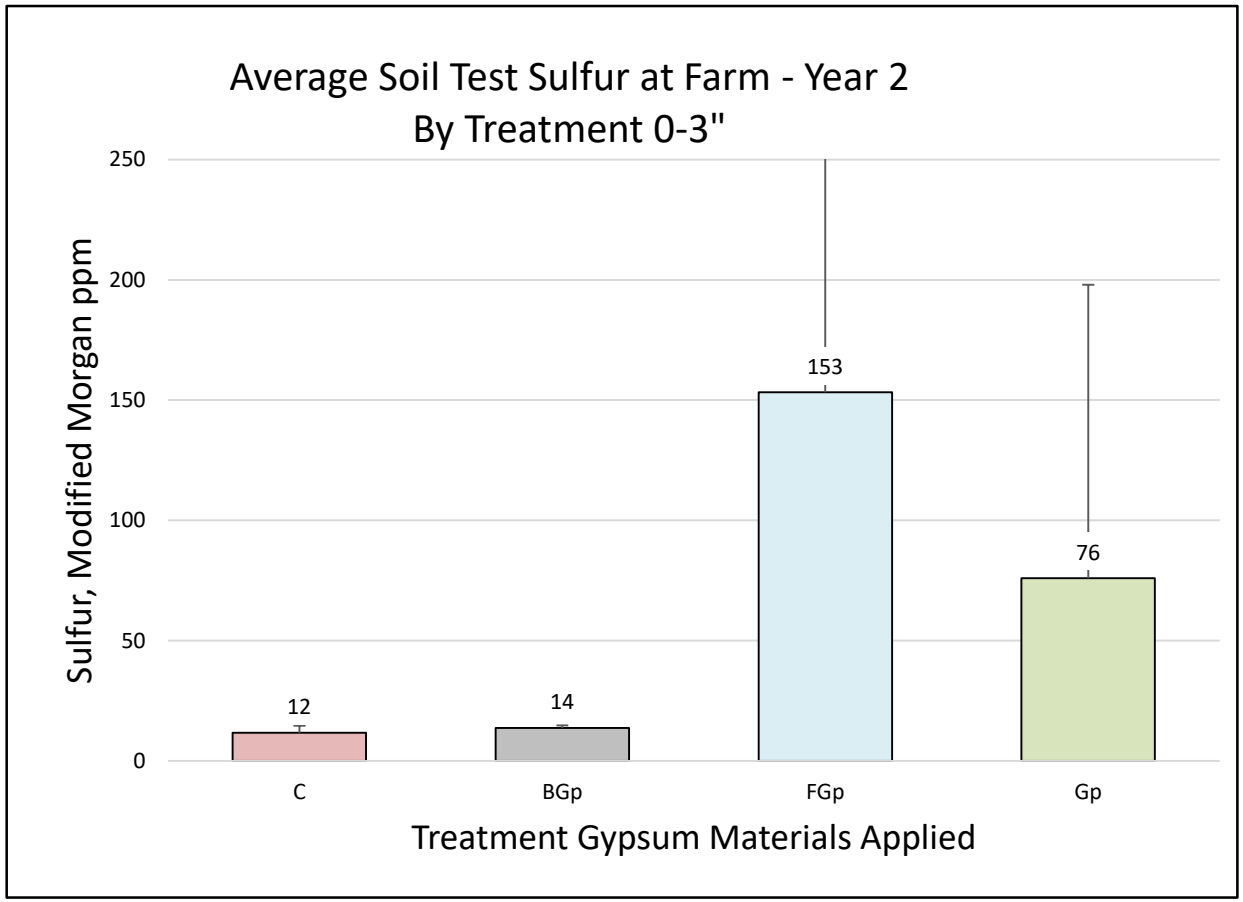
Improve Soil Health and Reduce Field Soil Test Phosphorus

- Gypsum Applications Increase Soil Test Sulfur



Soil Health CASH

Ca:Mg

Soil Aggregation

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Subsurface Phosphorus and Nitrogen in Tile Drainage

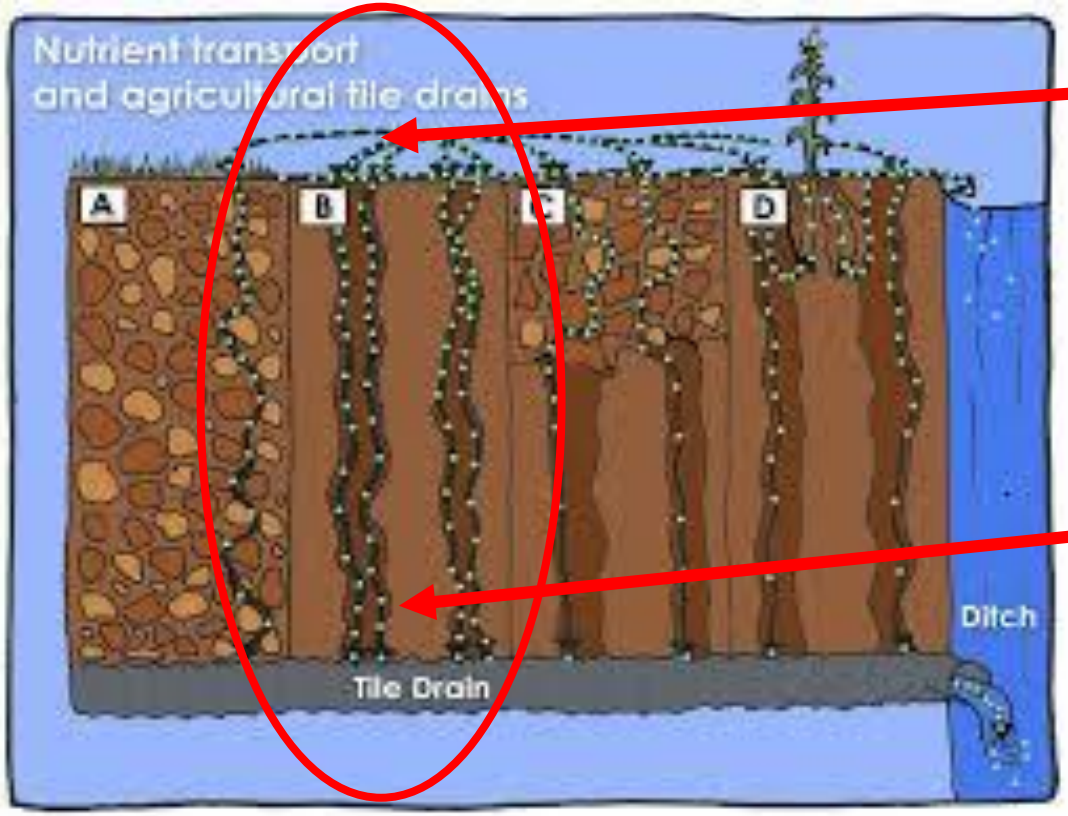


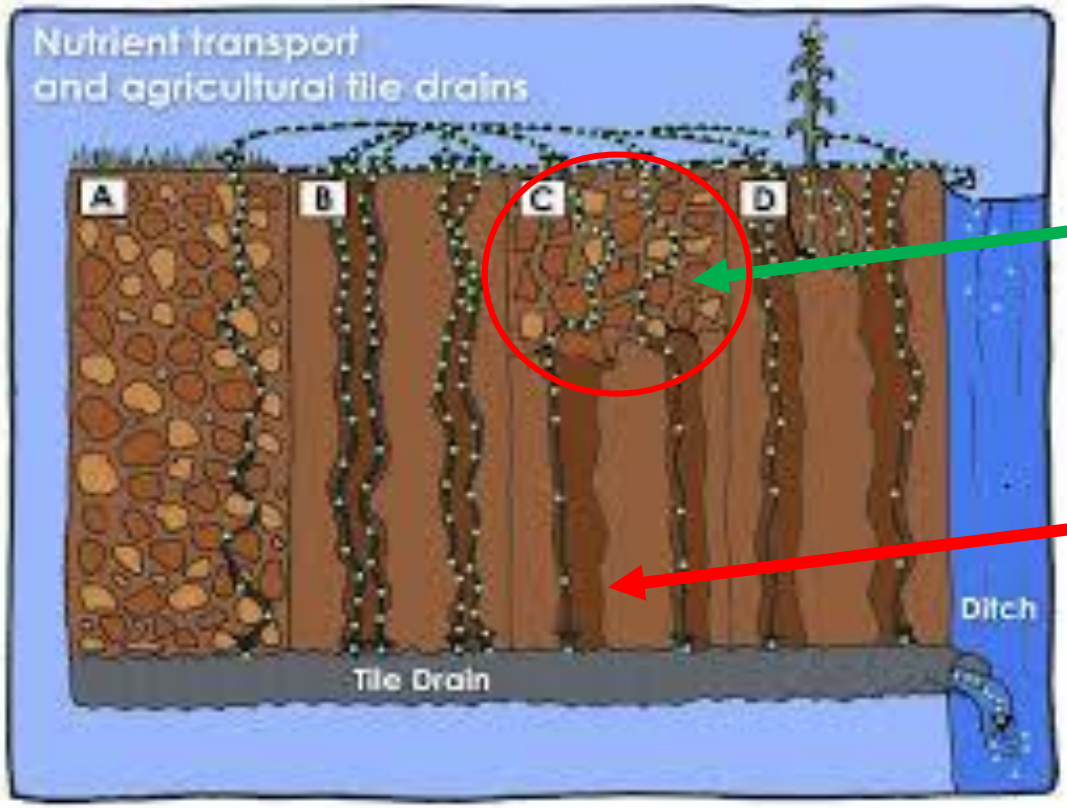
Figure 2. Representation of soil type and nutrient flow in A) Sandy soil with matrix flow, B) Clay soil with preferential flow via macropores, C) Tilled soil with disturbed surface macropores, and D) Plant uptake of nutrients. (Illustration courtesy of Amanda Gervais)

Concentration of Nutrients at Surface

Preferential Flow Pathways: Cracks, Holes, Channels, Macropores

From UVM Extension - Tile Drainage in Vermont: Benefits and Risks. Factsheet No.2

Subsurface Phosphorus and Nitrogen in Tile Drainage



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Tillage to Interrupt Macropores

Preferential Flow Pathways:
Cracks, Holes, Channels, Macropores

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Subsurface Phosphorus and Nitrogen I

Is This the NEW No-Till ?
Vertical Mulch-Till
&
No-Till Planting

Disrupt Preferential Flow Path in Soil

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Or is this enough ?
Incorporate Manure and Fracture the soil

No-Till Crop System Tradeoffs

- Visible Herbicide action on Cover Crops in spring
- Increased Need for Fertilizer with No-Till
- Manure on surface of soil - N loss, Runoff potential
- Machinery Tracks and Compaction

WHAT DO I NEED FOR NEW TECHNOLOGY?

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Manure in No-Till Systems

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No-Till with Manure

4R Principles

The 4R nutrient stewardship principles are the same globally, but how they are used locally varies depending on field and site specific characteristics such as soil, cropping system, management techniques and climate. The scientific principles of the 4R framework include:

RIGHT SOURCE – Ensure a balanced supply of essential nutrients, considering both naturally available sources and the characteristics of specific products, in plant available forms.

RIGHT RATE – Assess and make decisions based on soil nutrient supply and plant demand.

RIGHT TIME – Assess and make decisions based on the dynamics of crop uptake, soil supply, nutrient loss risks, and field operation logistics.

RIGHT PLACE – Address root-soil dynamics and nutrient movement, and manage spatial variability within the field to meet site-specific crop needs and limit potential losses from the field.

Source: 4Rs nutrient stewardship, The Fertilizer Institute

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Nutrient Boom

Doug Young, Spruce Haven Farm and Research Center
Cuff Farm Services

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