2020 No-Till & Cover Crop Symposium

February 26, 2020
Burlington, VT
A Little House Keeping
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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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- SEEDWAY
- earthlife
- A&K Agriservices, LLC
- RMI
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Exhibitors

Farmer’s Watershed Alliance
Franklin & Grand Isle
FarmersWatershedAlliance.org

Vermont Housing & Conservation Board
Vermont Farm & Forest Viability Program

Champlain Valley Farmer Coalition Inc.

USDA Risk Management Agency
Thank You for your Support
Precision Ag

Scott Magnan operates a custom service business in St. Albans, Vermont. He has become proficient in installing and providing education to farmers on precision ag equipment and software to enable his customers to get the biggest return on their investment.
Views from The Field

Jeff Sanders - UVM Extension
Hear how some of the Northeast’s progressive farmers meet the challenges of a no-till cover cropped system.

Mark Anderson
Landview Farms LLC, White Creek, NY

George Foster
Foster Bros. Farm, Middlebury, VT
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UVM Research

Heather Darby

UVM Soils and Agronomy Specialist with focused research on niche crop variety trials, weed management and cropping system strategies.

Cropping Systems for Conservation Agriculture - Research Results and Future Projects
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
UVM Extension Farm Business

Betsy Miller

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

Economics, Profitability and Tracking the Right Metrics - Case Studies & Tools
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
Where are we Headed with No-Till Corn?

Jeff Carter
UVM Extension
Middlebury, VT
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?

2018 BMPS
4,838 acres Corn

- Manure Inject: 6%
- Cover Crops: 47%
- Reduced-Till: 22%
- No-Till: 28%
- Conservation-Till: 50%
- Total Corn Acres: 100%
Nitrogen Response in Corn To Cover Crop
Winter Rye v. Daikon Radish
What Value $$ For Soil Health ?
What Value $$
For Soil Health ?
Water Infiltration – Save soil, N,P
Root Depth Available – Yield $$
Soil Water Available - Drought
Plant Nutrients Available $
Organic Matter - N, Carbon, PES
Biological Diversity - Soil Organisms
Soil Aggregate Structure
What Value $$ For a Cover Crop ?

“I Get a Great Cover Crop EVERY YEAR ”

What Value Do we put on = Service to:

Environment and Public Good

PLUS +

Farm and Related Business Profitability

$$, $$$, $$$$, $$$$
Do you use Cover Crops for different $$ 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
CSF Winter Cover Crop Planting Scheduler

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

Cover Crop
Rye

Probability of cover crop establishment before end of season (Rye)
Planting Date: 10/01

GDDs (base 42) from planting date (10/01) through end of season

CSF Winter Cover Crop Planting Scheduler

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Probability of cover crop establishment before end of season (Rye)
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GDDs (base 42) from planting date (10/01) through end of season

Oct 1

Middlebury, VT
300 GDD - 10 out of 15 Years
Middlebury, VT
300 GDD - 2 out of 15 Years

CSF Winter Cover Crop Planting Scheduler
No-Till Challenges

High P Soils / P Stratification
Preferential Flow Paths in Soil
No-Till System Trade-offs
Available Phosphorus
Shallow 0-3" and Water Soluble 0-3"

Phosphorus (ppm) Modified Morgan

Avail P 0-3"  Water P 0-3"

1. Available Phosphorus at Soil Surface
2. Water Soluble P at Soil Surface
3. Available P 0-3" and Water P 0-3"
Does Gypsum Decrease Soil Test P?

*Improve Soil Health and Reduce Field Soil Test Phosphorus*

**2017**
Preliminary Soil Tests

**Fall 2017 & Fall 2018**
Gypsum Materials Applied
- Flue Gas Gypsum (1,875 lb/ac)
- “Nutrisoft DG” (1,250 lb/ac)
- “Black Ag Gypsum DG” (625 lb/ac)

**2018 & 2019**
Soil Test Phosphorus - multi depths
Corn Crop - Yield & P recovery
Cover Crop - Yield & P recovery

**2019 - CASH Test**
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
**Improve Soil Health and Reduce Field Soil Test Phosphorus**

- Gypsum Applications Increase Soil Test Sulfur

**Average Soil Test Sulfur at Farm - Year 2**

By Treatment 0-3"

- **Soil Health CASH**
- **Ca:Mg**
- **Soil Aggregation**
Subsurface Phosphorus and Nitrogen in Tile Drainage

Concentration of Nutrients at Surface

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)

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

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Subsurface Phosphorus and Nitrogen in Tile Lines

Disrupt Preferential Flow Path in Soil

Is This the NEW No-Till? Vertical Mulch-Till & No-Till Planting
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
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
Nutrient Boom
Doug Young, Spruce Haven Farm and Research Center
Cuff Farm Services