

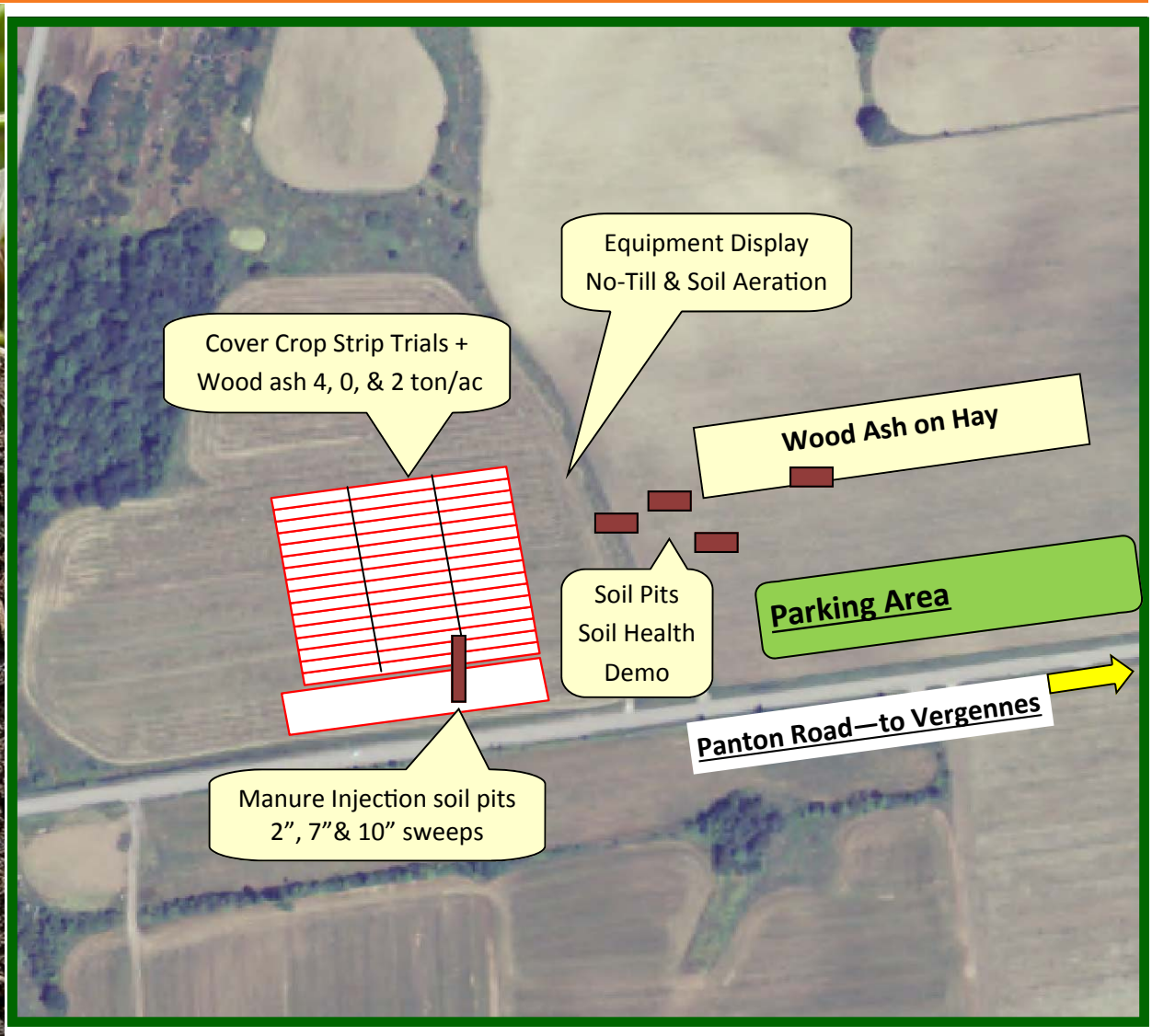


UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

SOIL HEALTH FIELD DAY

August 29, 2014

Vorsteveld Family Farm | Panton, Vermont



Champlain Valley Crop, Soil & Pasture Team

Jeff Carter
Agronomy Specialist:
Field Crops & Nutrient Mgt.
Certified Crop Adviser
jeff.carter@uvm.edu

Rico Balzano
Agronomy Outreach
Certified Crop Adviser
rico.balzano@uvm.edu

Kirsten Workman
Agronomy Outreach
Certified Crop Adviser
kirsten.workman@uvm.edu

Cheryl Cesario
Grazing Outreach
Certified Crop Adviser
cheryl.cesario@uvm.edu

Nathaniel Severy
Agronomy Outreach
nathaniel.severy@uvm.edu

Daniel Infurna
Kristin Williams, M.S.
Lindsey Ruhl
Research Field Technicians

23 Pond Lane, Suite 300
Middlebury, VT 05753
(802) 388-4969

UNIVERSITY OF VERMONT EXTENSION

www.uvm.edu/extension/cvcrops

Helping you put research-based knowledge to work!

AGENDA

Please check in at the registration table when you arrive!

Welcome, Rainfall Simulator & Soil Health Demos	**10:00—11:00**
Soil Pit Tour *get up close with clay soil in multiple soil pits* *wood ash and SPF applications*	**11:00—12:00**
Lunch *(NOFA-VT Pizza Oven & Lasagna)*	**12:00—1:00**
Field Walk *No-Till cover crop plots* *manure injection strips 2", 7", 10" sweeps*	**1:00—2:00**
Equipment Tour & Demonstrations	**2:00—3:00**

Our Speaker

JOEL MYERS

No-Till Consultant (Pennsylvania)

Joel currently serves as a private consultant specializing in No-Till Systems, including cover crops. In addition to his home farm, he annually plants about 400 acres of no-till corn for a friend who also is a long term continuous no-tiller. He and his brother operate a 75-acre farm in Centre County for the PA No-Till Alliance. This farm has been in continuous no-till operation for over 30 years.

He previously worked as a certified crop advisor within the ASA, and as a State Agronomist for 18 years for the Natural Resources Conservation Service. Joel also served as the technical coordinator for the Pennsylvania No-till Alliance. A particular area of focus is the transition that producers must make to move into continuous no-till systems and how to positively address the issues of the transition.

Thank You to our Sponsors:

Thank you to our partners and sponsors who made this event possible!

Vorsteveld Family Farm
A big thank you to the Vorsteveld family for hosting our field day.

Resource Management Incorporated
RMI supplied wood ash and financial assistance for the field day

Matthew's Trucking LLC & Custom Manure Handling
Matt & Eric Severy provided in-field demonstrations of manure injection and equipment to the field day.

Lawes Agriculture Service Inc.
Lawes Ag provided their time, labor and truck to spread the wood ash.

SeedWay
SeedWay supplied cover crop seed for the demonstration plots.

T.A. Seeds & Cover Crop Solutions
T.A. Seeds supplied Cover Crops Solutions seed for the demonstration plots

Champlain Valley Equipment
Provided equipment for demonstration

Mountain View Equipment, LLC
Provided equipment for demonstration

Huestis Farm Supply
Provided equipment for demonstration

Financial Sponsors: ***Ben & Jerry's Caring Dairy***
Vermont Agency of Agriculture, Food & Market
Champlain Valley Farmer Coalition
Otter Creek Conservation District

What is Soil Health and How Do We Get There??

What is Soil Health??

Healthy soils are:
- Well-structured
- High in organic matter
- Full of life
- Covered all the time

Soil Health is the newest 'buzz word' in agriculture. But just what do we mean by soil health, why do we care, and how do we get there? Healthy soils support high yielding crop production, conserve resources, help farmers mitigate the effects of climate change, and protect our natural environment and water quality. Farmers are the first line of defense when it comes to soil health. By managing your farmland in a way that builds soil health, you not only lessen your impact on the environment, but can create system that provides a huge benefit to your whole community and beyond.

Below are some practices that farmers in Vermont are using to build soil health on their farms.

Till the soil as little as possible:

Tilling the soil destroys organic matter, structure, and habitat for soil organisms. Soils managed in a reduced/no-till system for several years build organic matter, preserve structure, and provide habitat for organisms that cycle nutrients to aid plant growth. Soils covered with crop residue and live cover crops absorb water better, reducing soil erosion and nutrient loss. Healthy soils cycle nutrients better reducing the need for supplemental fertilizer. This, along with savings from less fuel use and labor in reduced/no-till system, can significantly improve the bottom line in most cropping systems.

Grow as many different species of plants as practical:

Crop rotations are timeless in agriculture. Here in our northeast dairy systems, mixed alfalfa and grass not only make great forage, they allow the soil to accumulate organic matter (as well as nitrogen from the alfalfa), and soil organisms. Living plants maintain a **rhizosphere**, an area of concentrated microbial activity close to the root. Because living roots provide the easiest source of food for soil microbes, growing perennial crops or long-season cover crops is the key to maintaining abundant soil microbes—so they'll be healthy and ready to perform throughout the primary growing season. When rotating back to corn silage, reduced/no-till management can preserve the organic matter and biology for several years of corn production while full-width tillage tends "burn up" those benefits in the first year of corn silage production.

Keep it Covered:

Vegetative cover provides a myriad of benefits to soil and improves crop production. Having either (or both) living cover and plant residues armoring your soil provides habitat for soil microbes, prevents soils from eroding, conserves soil moisture, increases water infiltration, contributes to increased organic matter and improves nutrient cycling. By having a living crop on your field 12 months a year, you not only protect the soil at the surface, but the roots provide all these benefits below the surface as well, plus help add to functional soil structure. A living cover crop can also help utilize excess moisture in our cooler, wetter climate in Vermont. Cover crops are a key component to 'jump starting' a no-till system.

Wood Ash as a Soil Amendment:

Wood ash is the byproduct of electric power generation from biomass power plants. When used as a soil amendment, wood ash contributes significant potassium as well as lower levels of phosphorus, calcium, magnesium, and micronutrients. As a liming agent, wood ash is approximately 20% equivalent (per wet ton) to lime.

Burlington Elect. Co. Wood Ash Nutrient Analysis

Lime (CaCO3)	450	#/wet ton
Potassium (K20)	55	#/wet ton
Calcium	140	#/wet ton
Magnesium	15	#/wet ton

Photo by UVM Extension

Lawes Ag spreading RMI wood ash across cover crop plots at the Vorsteveld Family Farm on Soil Health Field Day site in early August 2014

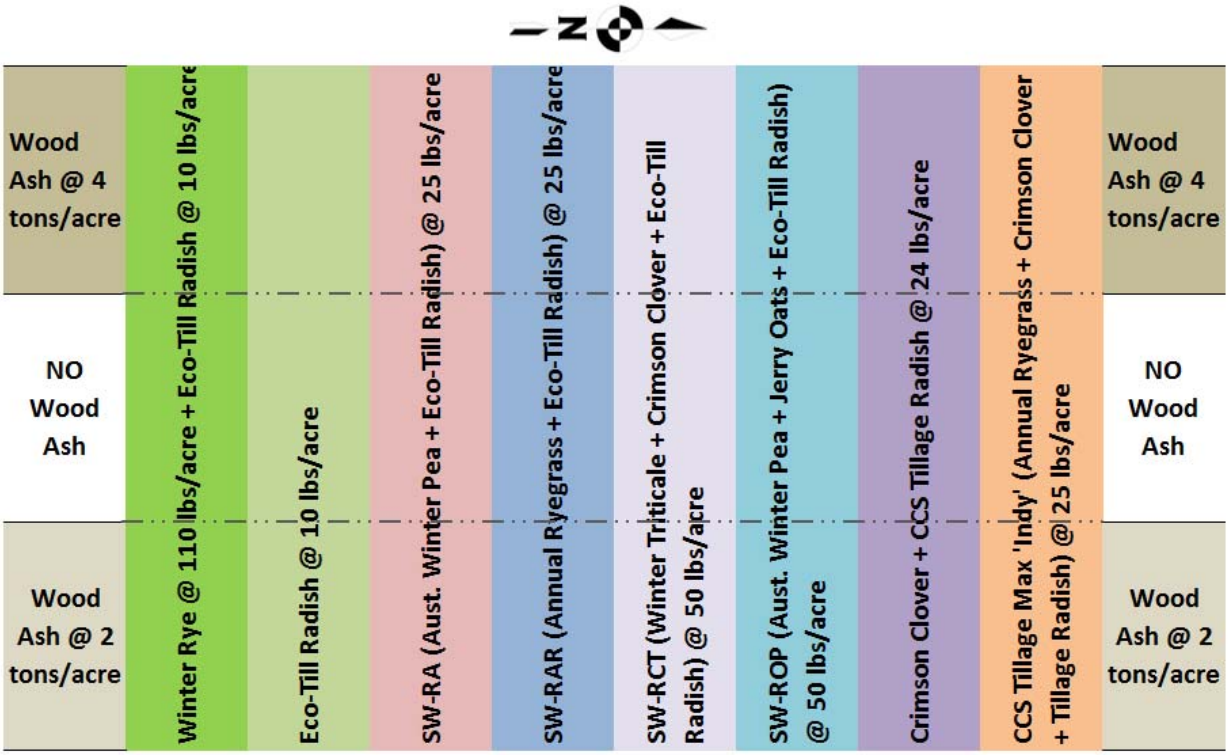
Amount of Wood Ash Needed Based on Soil Recommendations

165 lbs. of potassium (K20) recommended = 3.0 wet tons of wood ash per acre

0.6 tons of lime per acre recommended = 3.0 wet tons of wood ash per acre

Cover Crop Plots

Vorsteveld Family Farm - Soil Health Field Day



Plots were planted with a Haybuster No-Till Grain Drill on 08-12-2014 immediately following Winter Rye harvest

NATURAL RESOURCES CONSERVATION SERVICE (NRCS)

USDA United States Department of Agriculture

unlock the secrets in the soil

www.nrcs.usda.gov

"We know more about the movement of celestial bodies than about the soil underfoot."

-Leonardo da Vinci

Living in the soil are plant roots, bacteria, fungi, protozoa, algae, mites, nematodes, worms, ants, maggots, insects and grubs, and larger animals.

science of soil

soil is

made of about
45% minerals
25% water
5% organic matter
25% air

what's underneath

Healthy soil has amazing water-retention capacity.

Every **1%** increase in organic matter results in as much as **25,000** gal of available soil water per acre.

One teaspoon of healthy soil contains **100 million-1 billion** individual bacteria

All of the soil microbes in **1ac/ft** of soil weigh more than **2 cows**

Earthworm populations consume **2 tons** of dry matter per acre per year, partly digesting and mixing it with soil

what it does

Healthy soil is key to feeding **9 billion** by **2050**

Sources: Composition of soil: The Nature & Properties of Soils page 17 (Nyle Brady, Ray R Weil) | Water holding capacity: Kansas State Extension Agronomy e-Updates, Number 357, July 6, 2012 | Bacteria in a teaspoon: Soil Biology Primer page c-1 (Elaine Ingham, Andrew R. Moldenke, Clive Edwards) | Microbes weight:The Nature & Properties of Soil page 458 | Earthworm population consumption: Earthworms a Penn State publication by Sjoerd Duiker, Assoc. Prof. of Soil Management and Richard Stehouwer, Assoc. Prof environmental Soil Science | Feeding people: The United Nations | USDA is an equal opportunity provider and employer.

Soil Health Management Systems Include:

What is it?		What does it do?	How does it help?
Conservation Crop Rotation Growing a diverse number of crops in a planned sequence in order to increase soil organic matter and biodiversity in the soil.		• Increases nutrient cycling • Manages plant pest (weeds, insects, and diseases) • Reduces sheet, rill, and wind erosion • Holds soil moisture • Adds diversity so soil microbes can thrive	• Maximize nutrients • Decreases use of pesticides • Improves water quality • Conserves water • Improves plant production
Cover Crop An un-harvested crop grown as part of planned rotation to provide conservation benefits to the soil.		• Increases soil organic matter • Prevents soil erosion • Conserves soil moisture • Increases nutrient cycling • Provides nitrogen for plant use • Suppresses weeds • Reduces compaction	• Improves crop production • Improves water quality • Conserves water • Maximize nutrients • Decreases use of pesticides • Improves water efficiency to crop
No Till A way of growing crops without disturbing the soil through tillage.		• Improves water holding capacity of soils • Increases organic matter • Reduces soil erosion • Reduces energy use • Decreases compaction	• Improves water efficiency • Conserves water • Improves crop production • Improves water quality • Saves renewable resources • Improves air quality • Increases productivity
Mulch Tillage Using tillage methods where the soil surface is disturbed but maintains a high level of crop residue on the surface.		• Reduces soil erosion from wind and rain • Increases soil moisture for plants • Reduces energy use • Increases soil organic matter	• Improves water quality • Conserves water • Saves renewable resources • Improves air quality • Improves crop production
Mulching Applying plant residues or other suitable materials to the soil surface to compensate for loss of residue due to excessive tillage.		• Reduces erosion from wind and rain • Moderates soil temperatures • Increases soil organic matter • Controls weeds • Conserves soil moisture • Reduces dust	• Improves water quality • Improves plant productivity • Increases crop production • Reduces pesticide usage • Conserves water • Improves air quality
Nutrient Management Managing soil nutrients to meet crop needs while minimizing the impact on the environment and the soil.		• Increases plant nutrient uptake • Improves the physical, chemical, and biological properties of the soil • Budgets, supplies, and conserves nutrients for plant production • Reduces odors and nitrogen emissions	• Improves water quality • Improves plant production • Improves air quality
Pest Management Managing pests by following an ecological approach that promotes the growth of healthy plants with strong defenses, while increasing stress on pests and enhancing the habitat for beneficial organisms.		• Reduces pesticide risks to water quality • Reduces threat of chemicals entering the air • Decreases pesticide risk to pollinators and other beneficial organisms • Increases soil organic matter	• Improves water quality • Improves air quality • Increases plant pollination • Increases plant productivity

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

CHAMPLAIN VALLEY

FARMER COALITION INC.

Join us TODAY and have your voice heard... share the story of what agriculture is doing RIGHT for water quality!!

WHAT is CVFC?

- Farmers **proactively addressing water quality issues** in **Addison, Chittenden & Rutland** counties
- Advancing local **farm economic resiliency** and **environmental stewardship**.
- **Education** & **outreach**, potential project **funding**, and facilitating **communication** between farmers, agencies & the public to **improve water quality**

WHO is CVFC?

You...members are accepted in several categories: farmers, support organizations, service providers, individuals, & Businesses

Champlain Valley Farmer Coalition, Inc.

Farmers working together for a clean Lake Champlain and thriving agriculture in Vermont.

Find out more at:

www.champlainvalleyfarmercoalition.com

(802) 388-4969 * 23 Pond Lane, Middlebury , VT 05753