

# COVER CROPS IN VERMONT: *BUILDING THE TOOLBOX*

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Burlington, VT  
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Champlain Valley  
Crops, Soil & Pasture Team

**EXTENSION**  
CULTIVATING HEALTHY COMMUNITIES



# Why Cover Crops, Why now??



# Reducing Erosion & Nutrient Loss

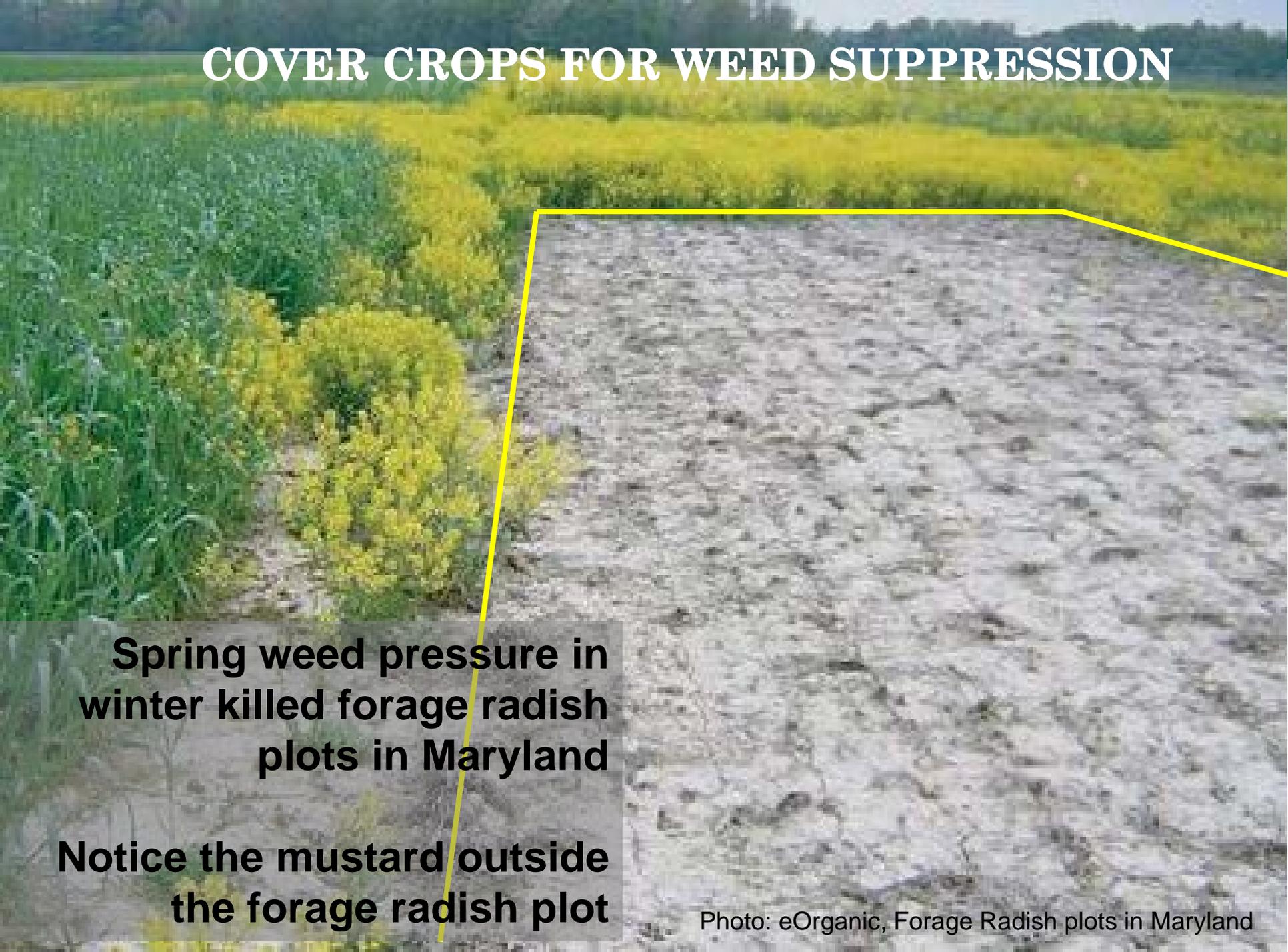


**Best use of fall manure applications...**  
***Fertilize a cover crop!***



**No. Williston Cattle Co, Williston**

# COVER CROPS FOR WEED SUPPRESSION



**Spring weed pressure in  
winter killed forage radish  
plots in Maryland**

**Notice the mustard outside  
the forage radish plot**

Photo: eOrganic, Forage Radish plots in Maryland

# Diversity & Habitat



Photo by: Lindsey Ruhl, UVM Extension

# Forage Opportunities

A group of brown dairy heifers are grazing in a lush green field. The field is filled with tall grass and some small white flowers. In the background, there is a dense forest of green trees. The scene is bright and sunny.

**Custom grazing dairy heifers the season  
before rotating to vegetables at  
*The Farm at VYCC, Richmond***

**HEALTHY SOIL = BETTER CROPS**



# WINTER RYE: Official Cover Crop of VT



# WINTER RYE: Official Cover Crop of VT

- Reliable Establishment – *earlier the better!*
- Good winter hardiness
- Can harvest for a forage crop
- Seed is available
- Works in lots of situations (herbicide, grazing, more)

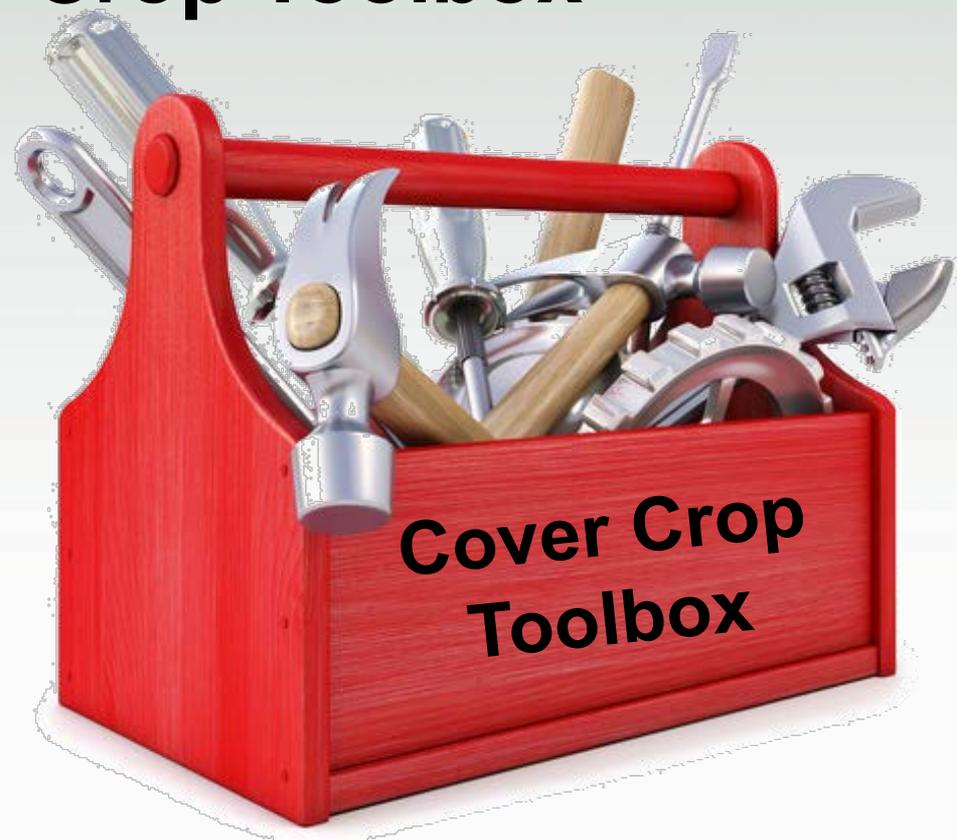
***Can we take it up a notch??***



# We need LOTS of tools in our Vermont Cover Crop Toolbox

- Timing
- Species
- Equipment
- Spring Management
- Understand the Benefits

***We have to be flexible!!***



## Cover Crop Toolbox: No-Till Grain Drills



**Drilling Winter Rye after a timely corn silage harvest  
Deer Valley Farm, Ferrisburgh**

**Cover Crop Toolbox:**  
**Interseeding Red Clover in**  
**Organic Corn Silage at last**  
**cultivation**



**Mountain Meadows Farm, Sudbury/Orwell**

A red tractor is shown from a rear perspective, moving through a field of tall, green cover crops. The tractor has a large red mulch blade attachment at the back, which is currently engaged with the ground. The tractor's rear wheels are large and have a deep tread pattern. The background consists of a dense line of green trees under a clear sky.

**Cover Crop Toolbox:  
Organic No-Till**

**Gleason Grains, Bridport**



**Cover Crop Toolbox:**  
**Broadcasting Cover Crops with Nitrogen**

**Pouliot Farm, Westford/Jericho**  
**Photo by: Tony Pouliot**



## **Cover Crop Toolbox:** **Broadcasting Cover Crops with Nitrogen**

**Pouliot Farm, Westford/Jericho**  
**Photo by: Tony Pouliot**

# Cover Crop Toolbox: High Boy Seeding Cover Crops Mid-Season



# Cover Crop Toolbox: Aerial Seeding into R1 Corn



Conant Farm, Richmond

**April 2013**  
**DeGraaf Dairy**  
**Richmond, VT**

**Winter Rye drilled after  
corn harvest...Sept. 25th**

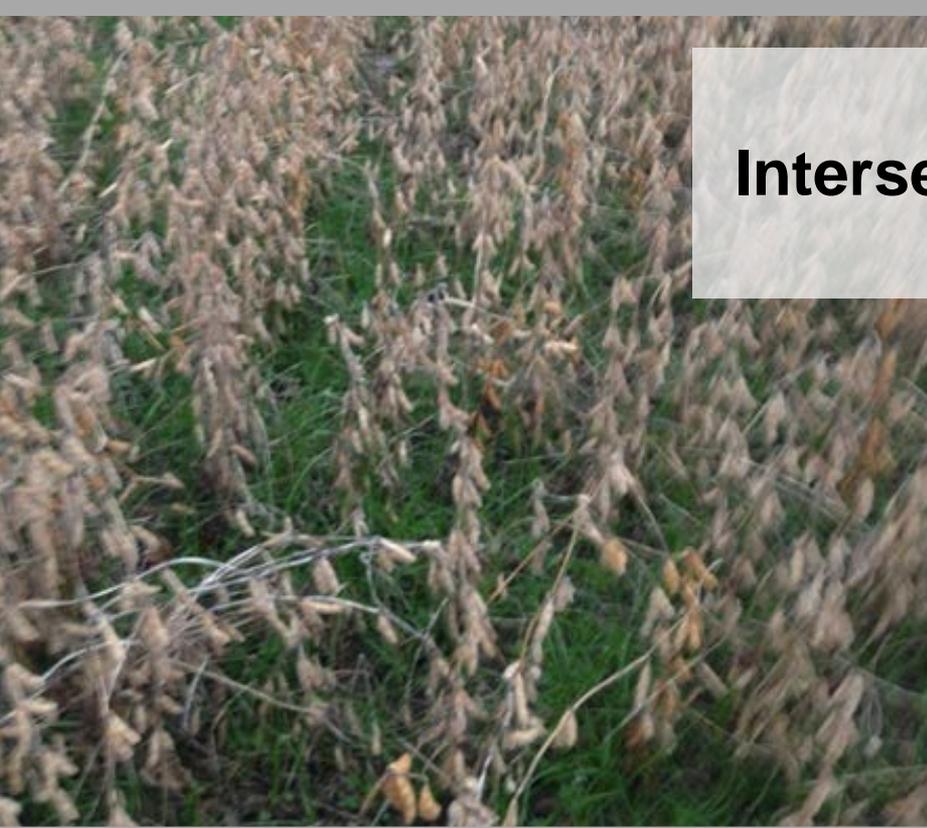
**Winter Rye flown into  
corn...Sept. 9th**

**Aerial Cover Cropping in Silage Corn**

# Aerial Cover Cropping in Grain Corn



**Senesac Farm, Colchester**



## Cover Crop Toolbox:

**Interseeding cover crops in soybeans  
On clay**



**Nichols Fodder Farm, Charlotte  
LaBerge Bros. Farm, Charlotte  
Nor-Dic Farm, Panton  
No-Mon-Nee Farm, Addison**

# Cover Crop Toolbox: Cover Crop Diversity in No-Till Systems Research & Demonstration Project



Using cover crop mixtures to enhance soil protection and nutrient recycling in a no-till system

# COVER CROP DIVERSITY IN A NO TILL SYSTEM DEER VALLEY FARM

## Cover Crop Mixes in Corn Silage

Mix 1 = Oat/Pea/Radish

Mix 2 = Triticale/Winter Pea/Winter Rape

Low Rate = 50 lbs/acre

High Rate = 116 lbs/acre



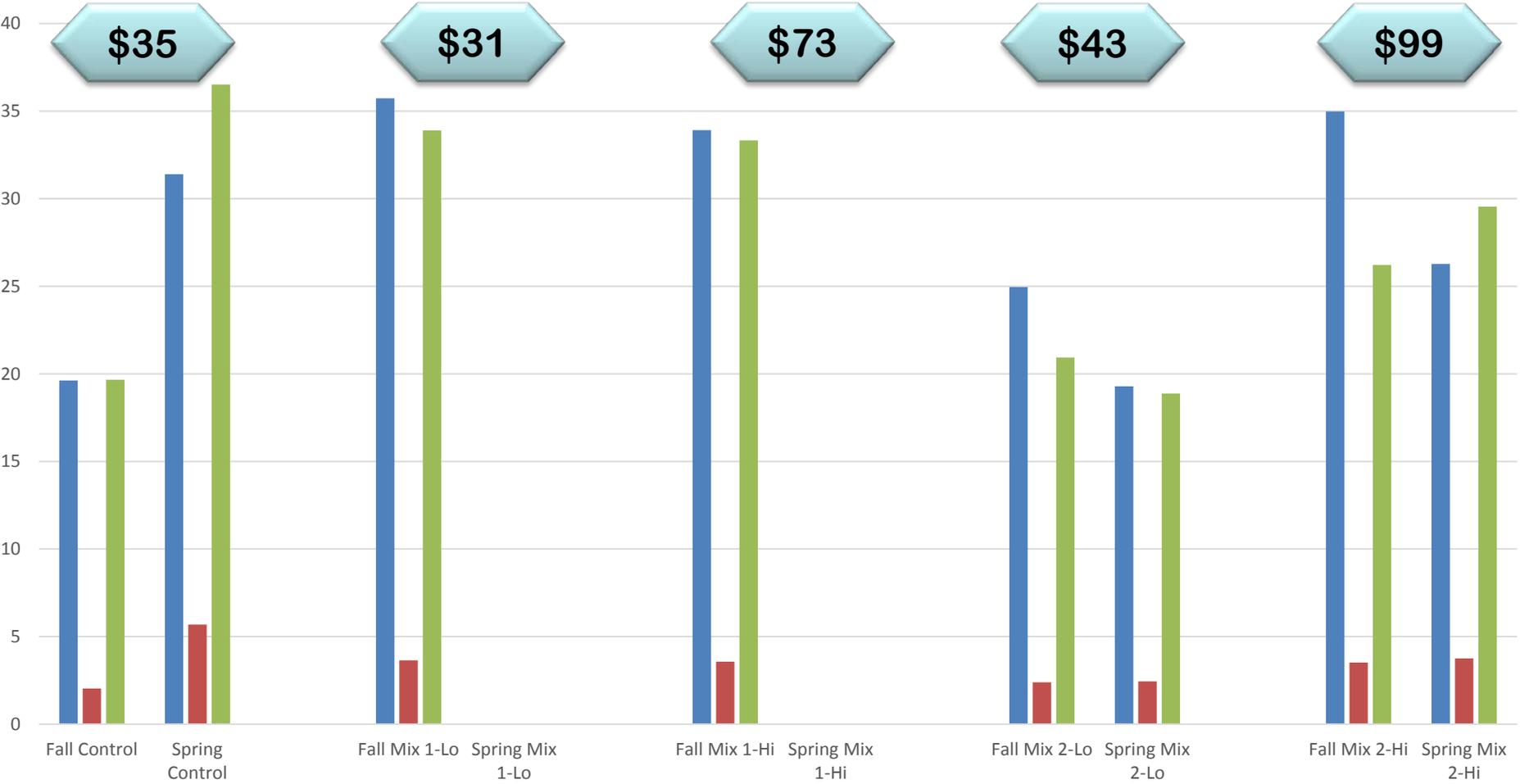
### Broadcast into standing corn: 8-15-13

### Drilled after corn harvest: 9-26-13

Row	Plot	Rate	Mix
R1	15	116	Mix 1
	14	116	Mix 2
	13	50	Mix 2
	12	100	Control (Winter Rye)
	11	50	Mix 1
R2	10	116	Mix 2
	9	50	Mix 2
	8	100	Control (Winter Rye)
	7	50	Mix 1
	6	116	Mix 1
R3	5	116	Mix 2
	4	116	Mix 1
	3	50	Mix 2
	2	50	Mix 1
	1	100	Control (Winter Rye)



# Fall 2013/Spring 2014 Nutrient Uptake by Mixture (SARE Cover Crop Diversity)



Winter Rye

Winter Kill Mix (low)

Winter Kill Mix (high)

Winter Hardy Mix (low)

Winter Hardy Mix (high)

# COVER CROP DIVERSITY IN A NO TILL SYSTEM

## What do I gain by adding diversity?

- Better Fall biomass production
- Better Fall erosion protection (% Cover)
- Increased Fall nutrient cycling
- Soil Biology benefits...different roots = different organisms
- Enhanced weed suppression??
- Increased Management...timing, termination, seeds, \$\$



# Cover Crop Toolbox: No-Till Planting into a Living Cover Crop



Deer Valley Farm, Ferrisburgh

# COVER CROP DIVERSITY IN A NO TILL SYSTEM

\*sampled on September 8, 2014...actual dry matters of corn silage averaged 26%, yields were adjusted to silage equivalents

Treatment	Seeding Rate	Method of Planting Corn	tons/acre (adjusted to silage @ 32% DM)*			
			Dry Matter tons/acre	Population	% DM @ Sampling	
Rye	112 lbs/acre winter rye	No-Till into green cover	17.62	5.64	29,333	26%
Mix 1-Hi	Oat/Pea/Radish @ 116 lbs/acre	No-Till into winter killed residue	19.98	6.39	35,000	26%
Mix 2-Hi	Triticale/W. Pea/W. Rape @ 116 lbs/ac	No-Till into green cover	17.63	5.64	34,000	28%
Conv.	no cover crop	Manure, Fall plowed, spring tillage	22.60	7.23	34,000	22%



**When Good  
Cover Crops  
go BAD!**

## Cover Crop Toolbox: Add a cereal grain to your rotation



Vorsteveld Farm, Panton



UNIVERSITY OF VERMONT **EXTENSION**  
CULTIVATING HEALTHY COMMUNITIES

Champlain Valley Crop, Soil & Pasture Team  
RESEARCH & DEMONSTRATION PROJECT

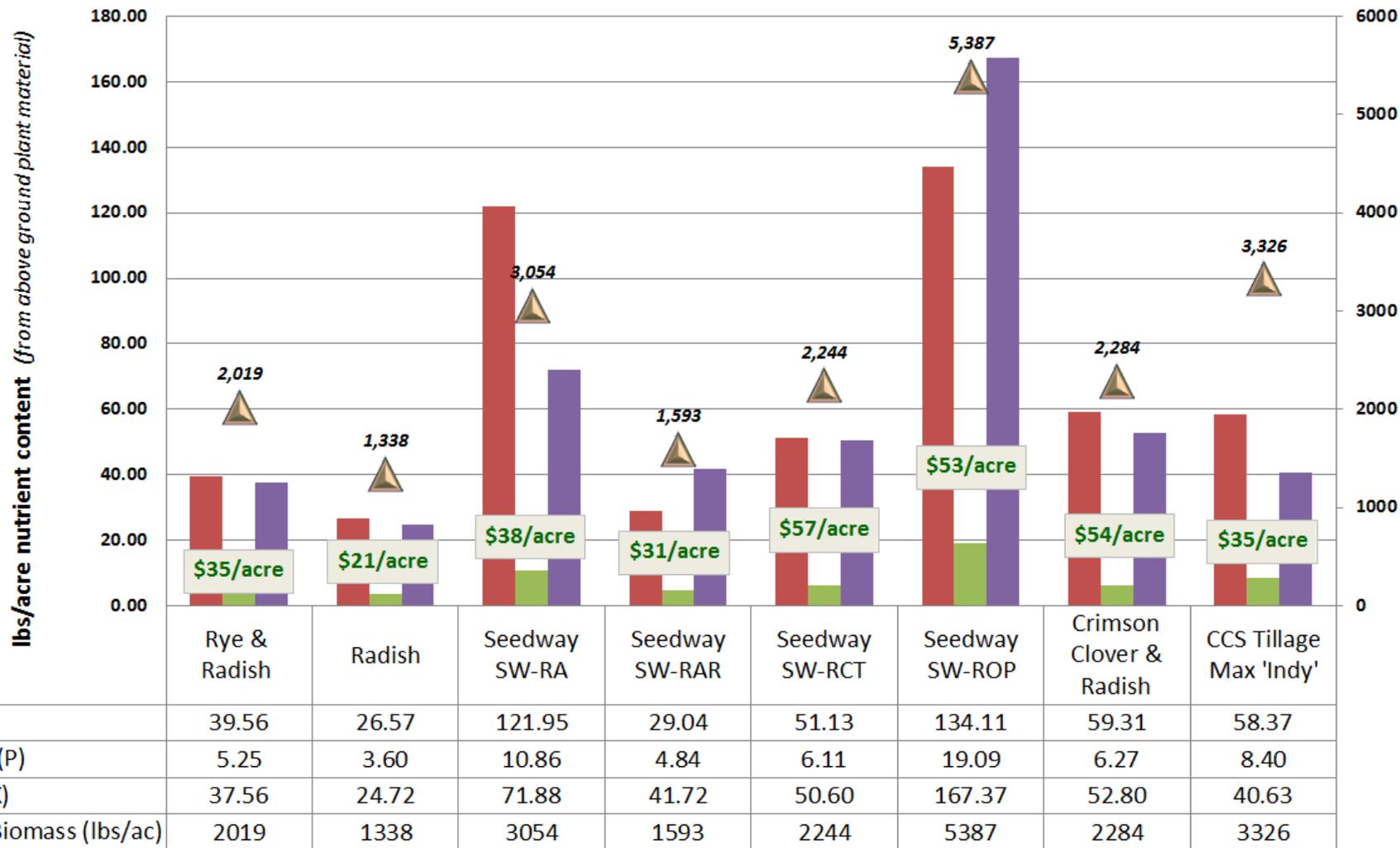
**SEEDWAY-ROP**  
Aust. Winter Pea  
+ Jerry Oat  
+ Eco-Till Radish  
50 lbs per acre

For more information: [www.uvm.edu/extension/everops](http://www.uvm.edu/extension/everops) or (802) 388-4969  
UVM Extension - Middlebury Office

**CROP ROTATIONS:**  
Add a cereal grain to your rotation...  
open up a great cover cropping or rotation opportunity

# COVER CROPS: VORSTEVELD FARM

Nutrient Uptake & Biomass of Cover Crop Mixes at Vorsteveld Farm - Planted on 08-12-2014, Sampled on 10-20-2014



# COVER CROP DIVERSITY...PHASE II

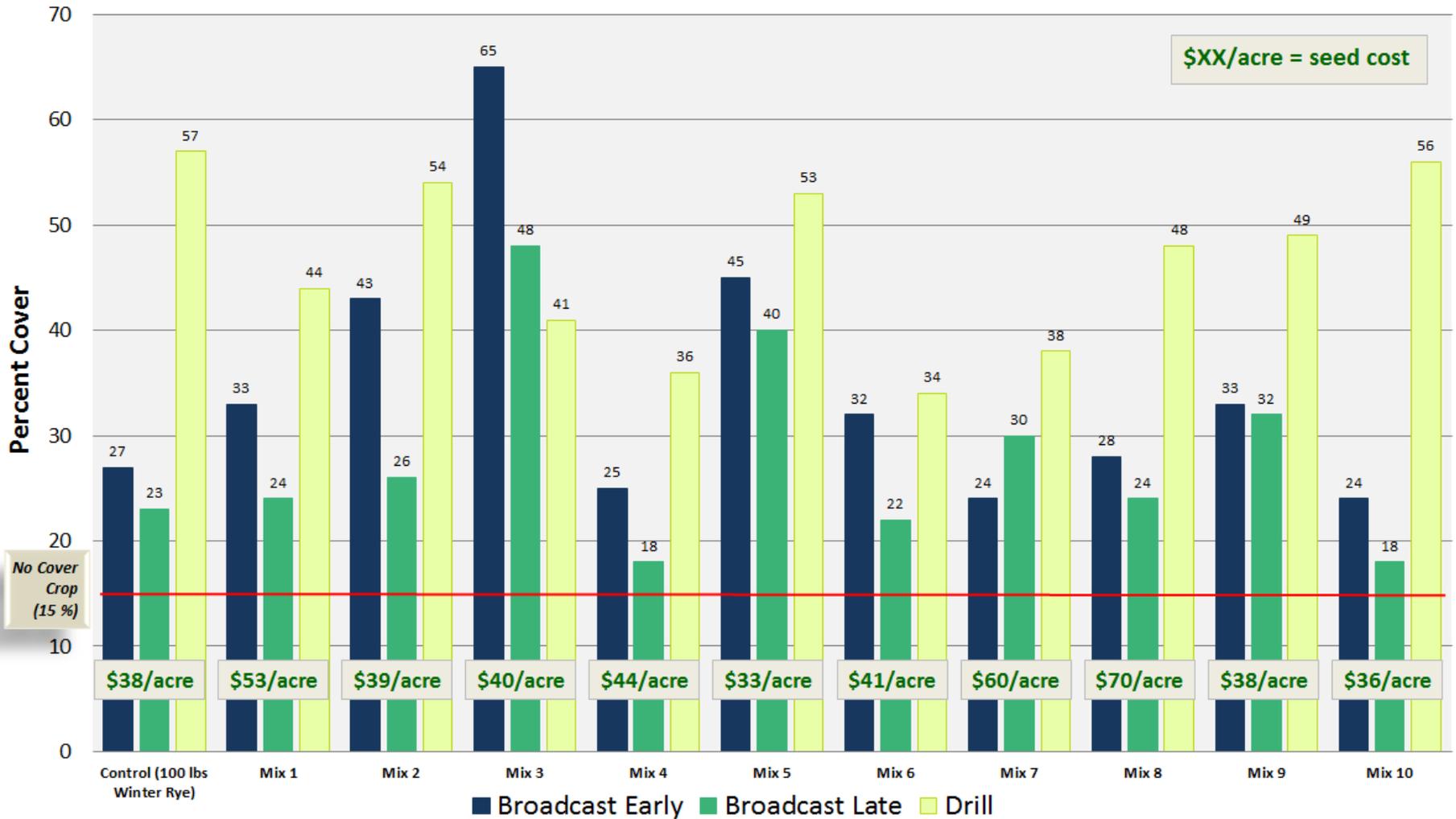
## Better Cover Crop Mixes for Vermont...

- 10 different mixes (grass/legume/brassica)
- Planted at three different times in corn silage systems
- Multiple farms, soils, situations, years

11-Jul-14 Early Broadcast					14-Aug-14 Late Broadcast					19-Sep-14 Drill						
					20 feet						20 feet					
	Grass/Grain	Legume	Brassica/Forbe	Lbs/Acre		Grass/Grain	Legume	Brassica/Forbe	Lbs/Acre		Grass/Grain	Legume	Brassica/Forbe	Lbs/Acre		
Control	Winter Rye			100		Control	Winter Rye		100		Control	Winter Rye		100		
Mix 1:	Forage Oats	Field Pea	Tillage Radish	60		Mix 1:	Forage Oats	Field Pea	60		Mix 1:	Forage Oats	Field Peas	Tillage Radish	60	
Mix 2:	Winter Triticale	Aust. Winter Pea	Rapeseed	80		Mix 2:	Winter Triticale	Aust. Winter Pea	80		Mix 2:	Winter Triticale	Aust. Winter Peas	Rapeseed	80	
Mix 3:	Ann. Ryegrass	Aust. Winter Pea	Tillage Radish	45		Mix 3:	Ann. Ryegrass	Aust. Winter Pea	45		Mix 3:	Ann. Ryegrass	Aust. Winter Pea	Tillage Radish	45	
Mix 4:	Winter Wheat	Aust. Winter Pea	Tillage Radish	80		Mix 4:	Winter Wheat	Aust. Winter Pea	80		Mix 4:	Winter Wheat	Aust. Winter Pea	Tillage Radish	80	
Mix 5:	Ann. Ryegrass	Clover - Berseem	Tillage Radish	25		Mix 5:	Ann. Ryegrass	Clover - Berseem	25		Mix 5:	Ann. Ryegrass	Clover - Berseem	Tillage Radish	25	
Mix 6:	Winter Triticale	Clover - Crimson	Tillage Radish	60		Mix 6:	Winter Triticale	Clover - Crimson	60		Mix 6:	Winter Triticale	Clover - Crimson	Tillage Radish	60	
Mix 7:	Forage Oats	Hairy Vetch	Mustard	45		Mix 7:	Forage Oats	Hairy Vetch	45		Mix 7:	Forage Oats	Hairy Vetch	Mustard	45	
Mix 8:	Winter Triticale	Hairy Vetch	Mustard	65		Mix 8:	Winter Triticale	Hairy Vetch	65		Mix 8:	Winter Triticale	Hairy Vetch	Mustard	65	
Mix 9:	Winter Rye	Aust. Winter Pea	Forage Turnip	80		Mix 9:	Winter Rye	Aust. Winter Pea	80		Mix 9:	Winter Rye	Aust. Winter Pea	Forage Turnip	80	
Mix 10:	Winter Rye	Clover-Crimson	Rapeseed	60		Mix 10:	Winter Rye	Clover-Crimson	60		Mix 10:	Winter Rye	Clover-Crimson	Rapeseed	60	

# BETTER COVER CROP MIXES IN VT

Percent Cover by Application and Seeding Mix (10/22/14)



# COVER CROPS & MANURE: PERFECT PARTNERS

*Triticale/Hairy Vetch Cover Crop Plots with/without manure @ VYCC*

Hairy Vetch Treatment (lbs./ac.)	Manure	AVG DM				FALL 2013	SPRING 2014
		Yield lbs/Ac	AVG lbs N/acre	AVG lbs P/acre	AVG lbs K/acre	AVG % Cover	AVG % Cover
10	Yes	939.0	28.4	6.2	43.7	32%	62%
20	Yes	<b>1115.1</b>	<b>34.0</b>	<b>7.4</b>	<b>52.6</b>	<b>35%</b>	60%
30	Yes	1035.0	31.7	6.9	48.4	34%	<b>64%</b>
10	No	250.8	12.3	2.4	16.8	17%	42%
20	No	<b>522.8</b>	<b>17.1</b>	<b>3.5</b>	<b>24.2</b>	<b>21%</b>	37%
30	No	501.5	16.5	3.4	23.1	16%	<b>43%</b>



# COVER CROPS & MANURE: VORSTEVELD FARM



2-inch wide sweeps



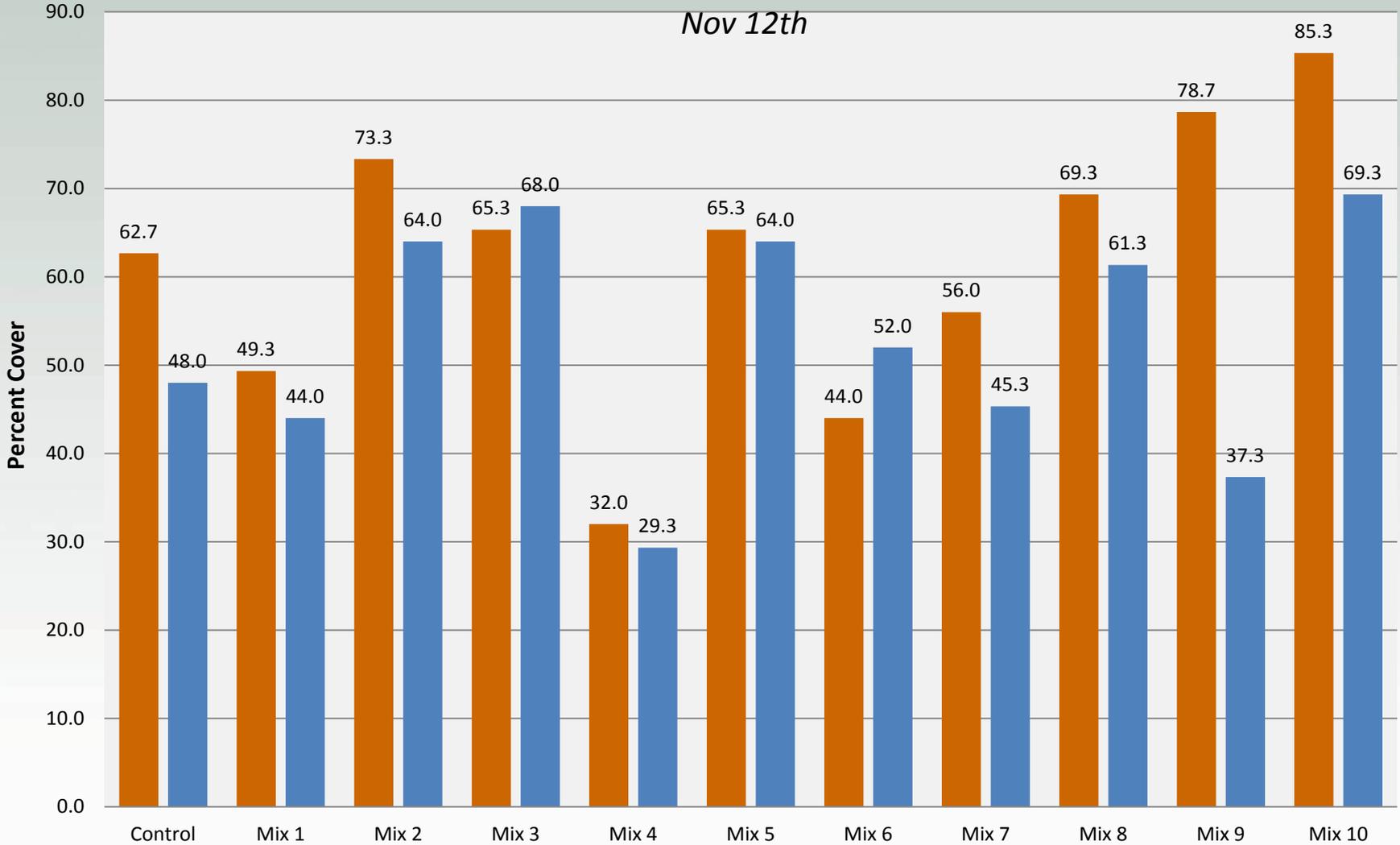
7-inch wide sweeps

Broadcast

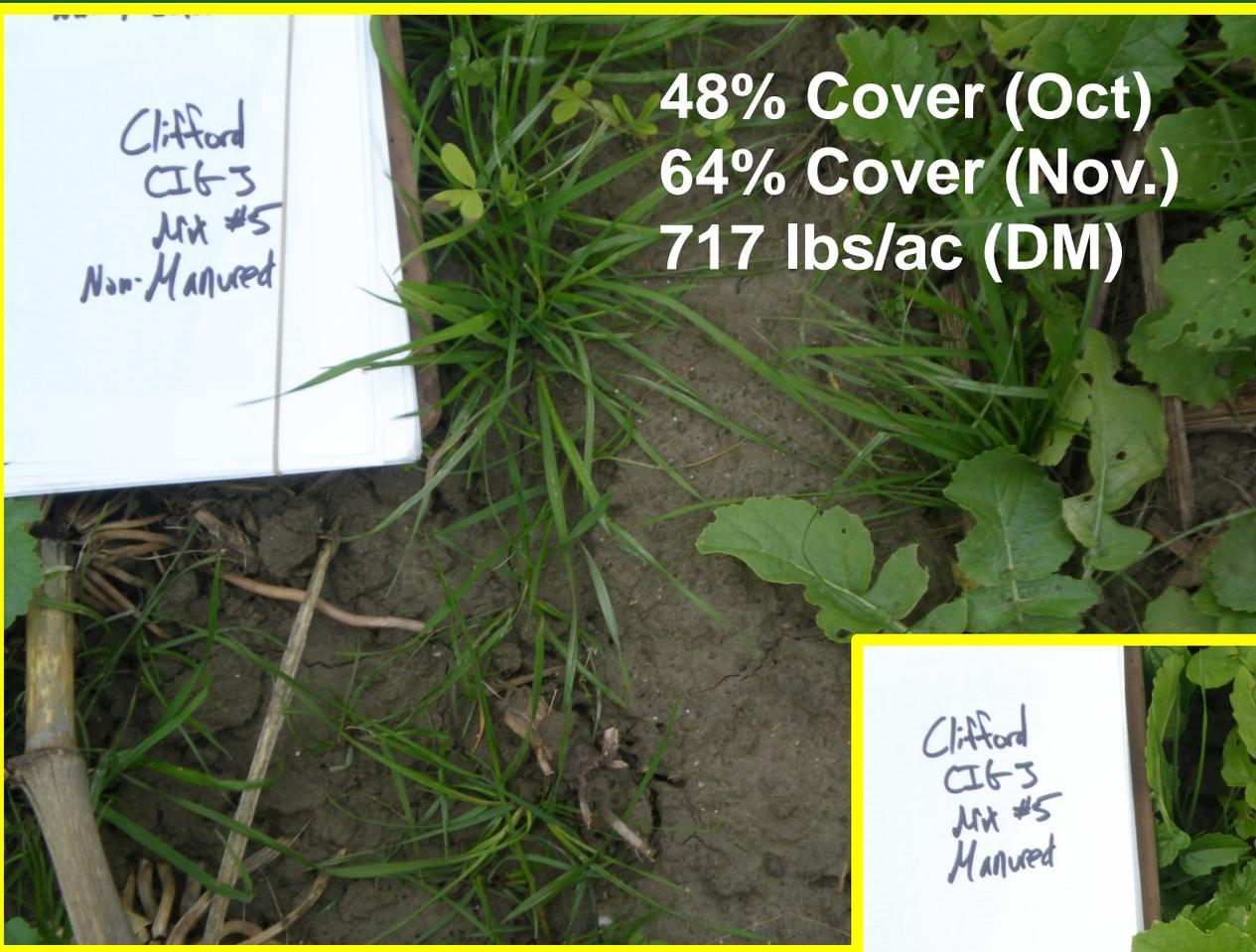
Figuring out YOUR System on YOUR soil...give yourself options

# CIG Cover Crop Mixes: Average Percent Cover of **Drilled** Plots With and Without Manure

*Nov 12th*



■ Manured Plots   ■ Non Manured Plots



**48% Cover (Oct)**  
**64% Cover (Nov.)**  
**717 lbs/ac (DM)**

## ***Cover Crops & Manure***

**19-Sept:**  
drilled after corn harvest  
**23-Sept:**  
6000 ga/ac manure applied  
**21-October:**  
Measured % cover  
Forage Samples  
**12-Nov:**  
Measured % cover



**58% Cover (Oct)**  
**65% Cover (Nov.)**  
**1280 lbs/ac (DM)**

### **CIG Mix #5:**

- Annual Ryegrass (15 lbs)
- Berseem Clover (5 lbs)
- Tillage Radish (5 lbs)

# COVER CROPS: WHAT'S NEXT??



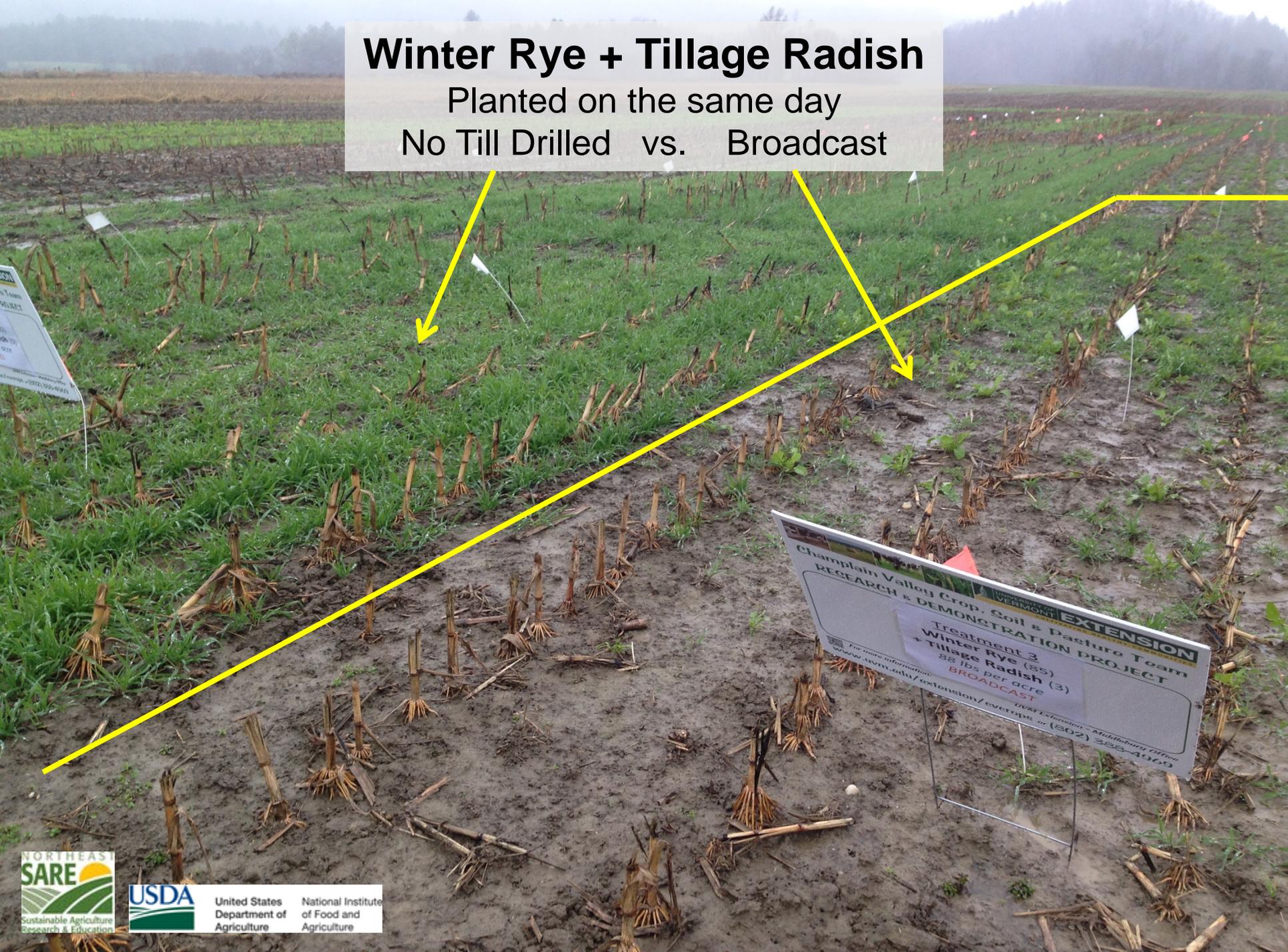
**Species  
Establishment  
Manure!**



# Winter Rye + Tillage Radish

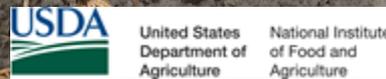
Planted on the same day

No Till Drilled vs. Broadcast



USDA  
SARE  
Team  
PROJECT  
with NY  
State  
www.usda.gov  
and phone: (800) 955-4644

USDA  
Champlain Valley  
RESEARCH & DEMONSTRATION PROJECT  
UNIVERSITY OF VERMONT  
EXTENSION  
Soil & Pasture Team  
Treatment 3  
Winter Rye (88)  
+ Tillage Radish (3)  
88 lbs per acre  
BROADCAST  
For more information  
www.uvm.edu/extension/evrops or (802) 388-4969  
UVM Extension - Middlebury Office



# COVER CROPS: WHAT'S NEXT??



## Winter Rye + Tillage Radish (RYRA)

- Biomass & Nutrient Content
- Narrowing down the impact of diversity
- Root vs. Shoot...biomass, nutrients
- Manure
- Drill vs. Broadcast



# THANK YOU! FARMERS & FUNDERS

Clifford Farm, Starksboro  
Conant Farm, Richmond  
Deer Valley Farm, Ferrisburgh  
DeGraaf Dairy, Richmond  
Farr Farm, Richmond  
The Farm at VYCC, Richmond  
Gleason Grains, Bridport  
LaBerge Bros. Farm, Charlotte  
Mountain Meadows Farm, Sudbury  
Nichols Fodder Farm, Charlotte  
No-Mon-Nee Farm, Addison  
Nor-Dic Farm, Panton  
No. Williston Cattle Co., Williston  
Pouliot Farm, Westford  
Senesac Farm, Colcheshter  
Vorsteveld Farm, Panton



# COVER CROPS IN VT

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*Champlain Valley Crop, Soil & Pasture Team*

*Helping You Put Knowledge to Work*

The Champlain Valley Crop, Soil & Pasture Team is a group of UVM Extension professionals working to provide technical assistance to Vermont Farmers in the Lake Champlain Watershed. We strive to bring you research-based knowledge that has practical applications on your farm and we address many production related issues such as:

- CROP PRODUCTION
- GRAZING MANAGEMENT
- SOIL HEALTH
- NUTRIENT MANAGEMENT
- WATER QUALITY

