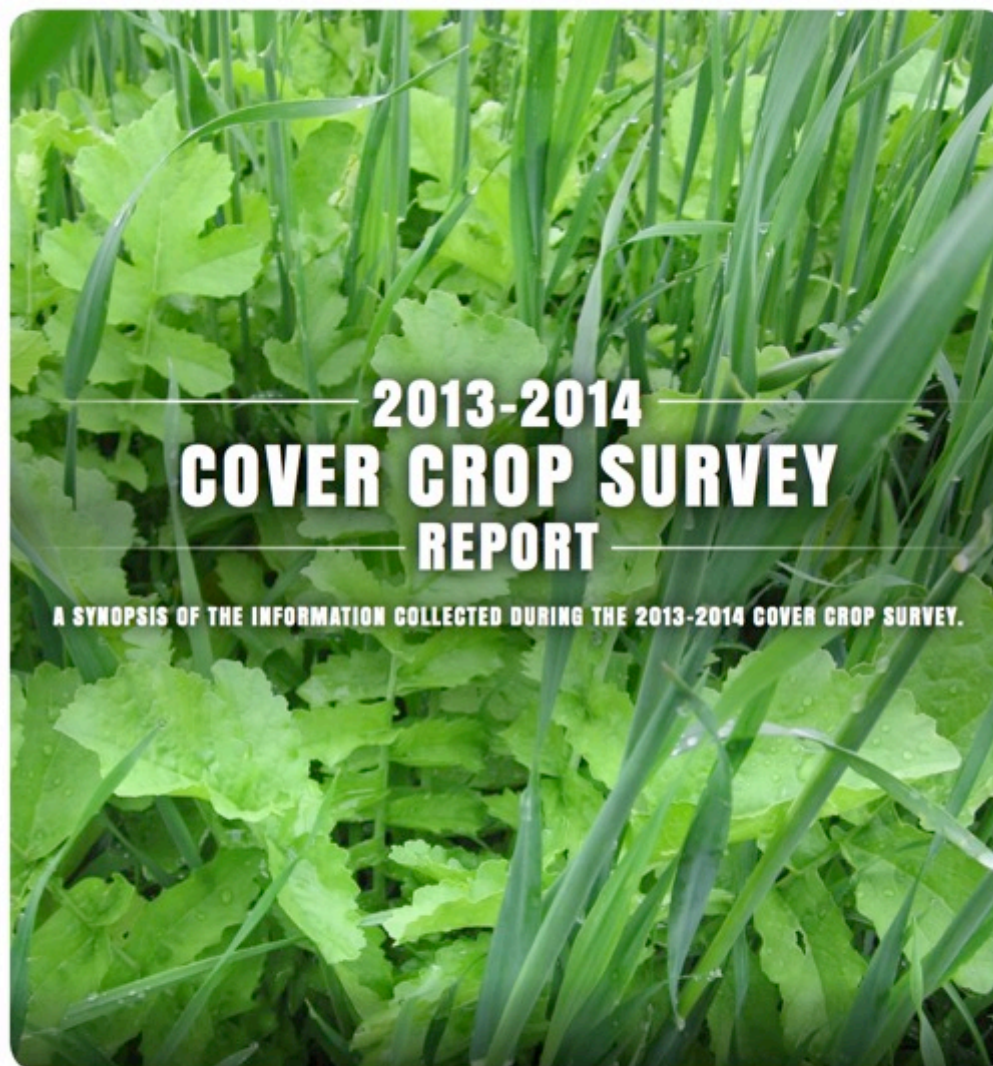




Interseeding Cover Crops Into Standing Grain Crops

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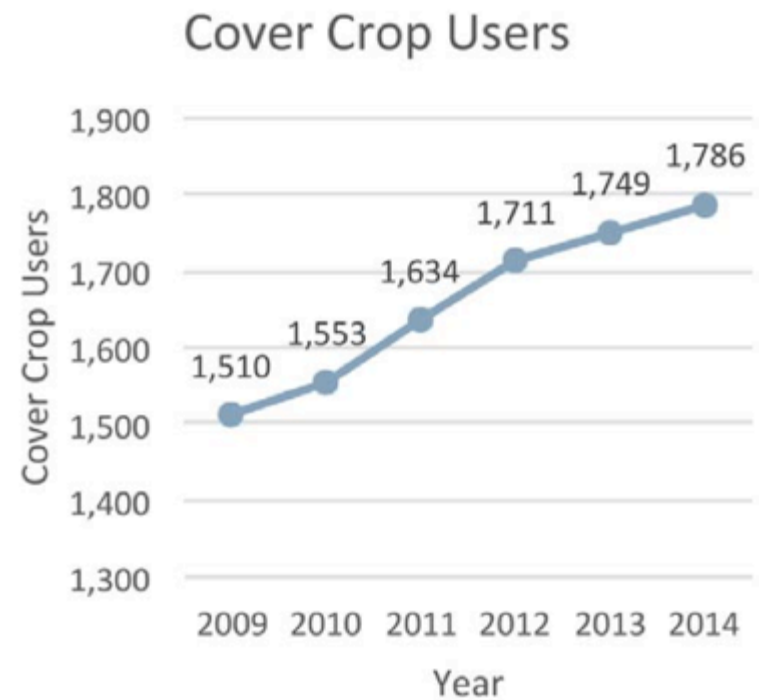
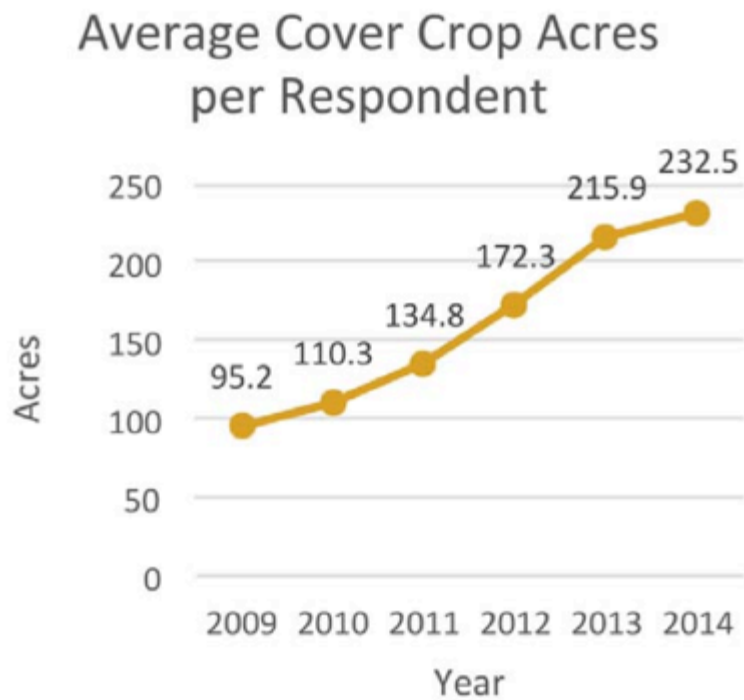
ABSTRACT

This document summarizes information from farmers across the United States, both users and non-users of cover crops, who responded to a cover crop survey. The report assesses attitudes about cover crops, perceived benefits and challenges surrounding their use, and communications channels that can aid in supporting the adoption and success of cover crops.

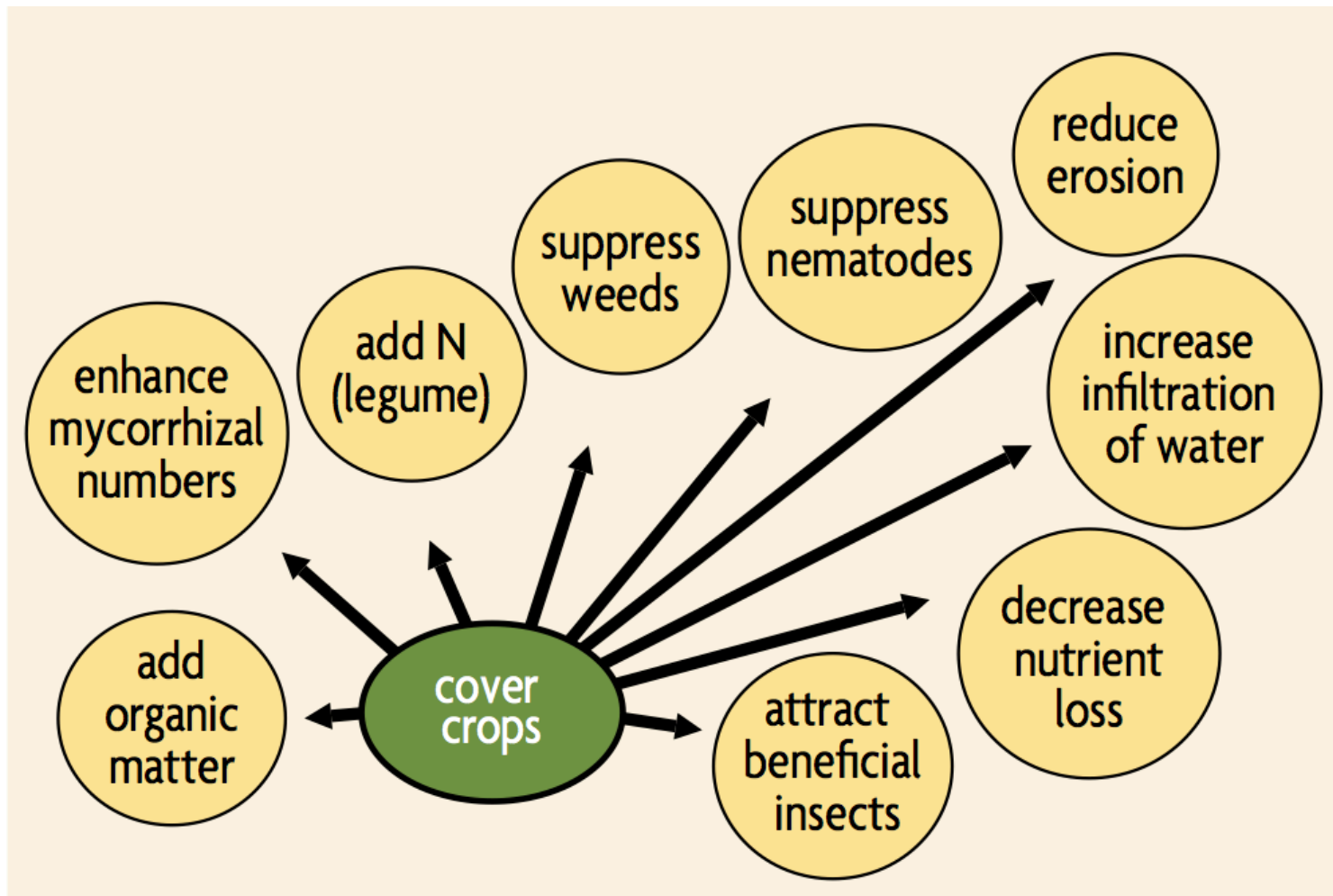


http://www.ctic.org/media/CoverCrops/CTIC_04_Cover_Crops_report.pdf

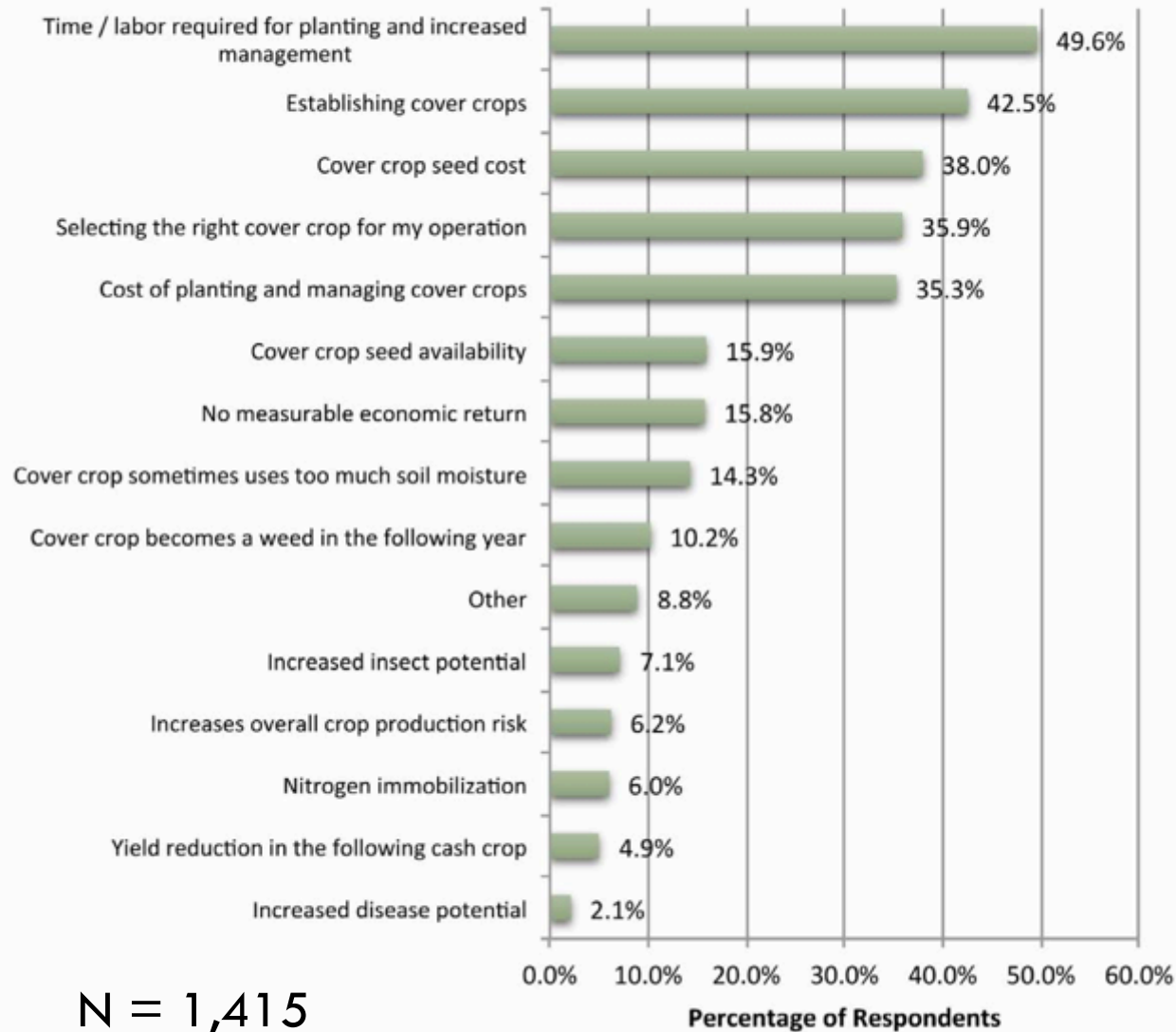
Increasing cover crop use



Benefits from cover crops



Cover Crop Challenges - Cover Crop Users



Alternatives to post-harvest seeding

Aerial seeding red clover in soybean



Alternatives to post-harvest seeding

Charlie Martin's
high-boy interseeder



Article in *No-till Farmer* on NY farmer

Rigging Up A Late-Season Cover Crop, Fertilizer Solution

“With help from a fabricator, New York strip-tiller Donn Branton converted a RoGator into a dual-purpose machine that seeds covers and dry fertilizer into standing corn and soybeans.”







Alternatives to post-harvest seeding



Three functions in a single, brilliantly engineered machine
Cover Crop Planter • Liquid Fertilizer and Herbicide Applicator • No-Till Grain Drill

\$20,000 to \$40,000
Depending on specifications



Rear mounted spray and sidedress booms

The interseeder can apply a post emergent herbicide between rows and then sidedress fertilizer adjacent to each using this boom setup.



Packing wheels and herbicide nozzles

These packing wheels ensure seed to soil contact and accurate planting depth adjustment for each of the three rows between each corn row.



Coulters on planting units

These coulters on each allow the interseeder to achieve good seed to soil contact in a wide range of soil and residue conditions.



Double disk openers

This tried and true system provides a uniform seed trench in various field conditions.

<http://www.interseedertech.com/>

Save by bundling operations

InterSeeder™

How it Works

At the V7 or earlier corn stage, there is enough sunlight penetrating the canopy for cover crop seeds to germinate and establish.

As corn grows and the canopy increasingly shades the row, the cover crop essentially lies dormant. This prevents the cover crop from competing with corn for nutrients and moisture.

When corn is harvested for silage or grain, the cover crops have already been growing for two months. They flourish and mature earlier than with any other cover crop planting method.

THREE JOBS IN A SINGLE PASS

Use the Interseeder at four to six weeks after planting, with corn at no later than V7 stage



1 APPLY SIDE DRESS NITROGEN

The Interseeder applies a precision application of Nitrogen 4" off the corn row.

2 APPLY POST MERGE HERBICIDE

Herbicide applied in the same pass under the corn canopy precisely targeting the weeds only.

3 PLANT COVER CROP

Lastly, the Interseeder plants the cover crop placing 3 rows between 30" corn rows.

NRCS Conservation Innovation Grant

- Evaluate new design under different on-farm conditions
- Compare different cover crop species and mixtures
- Document impact on host and subsequent crops



Curran, WS, MR Ryan, and SB Mirsky. 2012. Maximizing conservation in the Chesapeake Bay Watershed with an innovative new 3-way interseeder for early establishment of cover crops in no-till corn and soybean. NRCS CIG.

Interseeding in New York

- Six cover crop treatments and seeding rates
 1. **Control:** no cover crop
 2. **KB Royal:** Annual ryegrass (20 lb/a)
 3. **Legumes:** Red clover (10 lb/a) + crimson clover (20 lb/a) + hairy vetch (15 lb/a)
 4. **Grass Legumes:** KB Royal (10 lb/a) + red clover (5 lb/a) + crimson clover (10 lb/a) + hairy vetch (7.5 lb/a)
 5. **Radish:** Tillage radish (5 lb/a)
 6. **Rootmax:** Annual ryegrass (20 lb/a)

- Population, cover crop biomass, crop yield







Plots at the Musgrave Farm (August 14, 2013)



On-farm trial in Central NY (July 7, 2013)



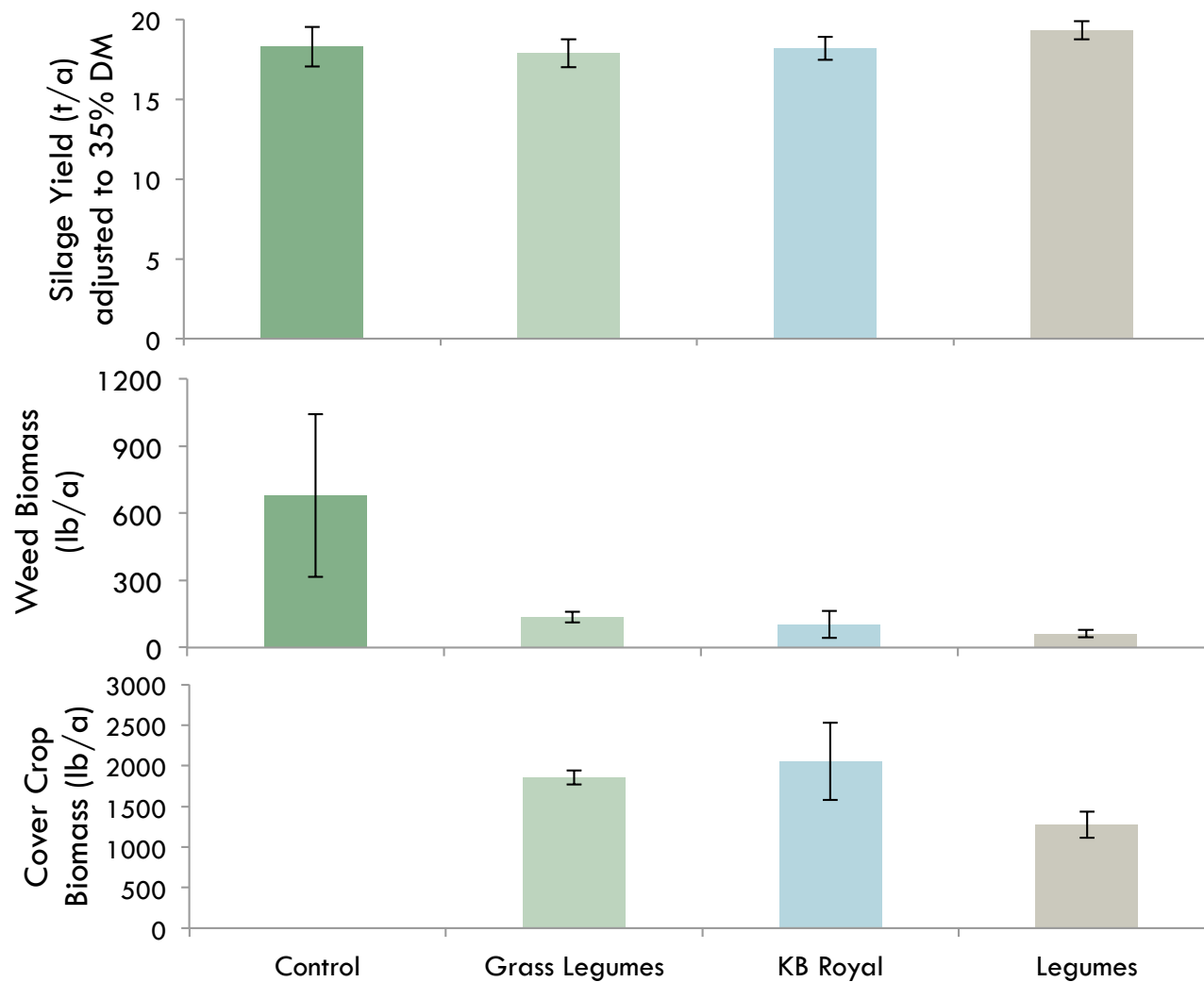




On-farm trial in Central NY (September 23, 2013)

Corn yield, weed, and cover crop biomass

Pine Hollow Farm, Virgil, NY (2013)



On-farm trial in Central NY (October 30, 2013)



On-farm trial in Central NY (October 30, 2013)



Cover Crop Interseeder CIG (2012-2015)

- Effects of cover crops on N supply in corn
 - 5 rates of nitrogen in subplots within cover crops plots

- Integrating with Adapt-N
 - Account for N from cover crops in recommendations
 - Opportunity to model effects on soil moisture
 - Challenge with estimating biomass (no easy method!)

Preliminary Results from Cover Crop Herbicide Trials

Grass Herbicides	Active Ingredient
<i>Higher Risk of Injury to Grass CCs</i>	
Dual II Magnum 7.64 EC	s-metolachlor
Zidua 85 WG	pyroxasulfone
<i>Lower Risk of Injury to Grass CCs</i>	
Prowl H2O 3.8 CS	pendimethalin
Outlook 6 EC	dimethenamid-P
Harness 7 EC	acetochlor

Broadleaf Herbicides	Active Ingredient
<i>Higher Risk of Injury to Broadleaf CCs</i>	
Callisto 4 SC	mesotrione
Impact 2.8 SC	topramezone
Balance Flexx 2 SC	isoxaflutole
<i>Lower Risk of Injury to Broadleaf CCs</i>	
Resolve 25 WG	rimsulfuron
Atrazine 4 L	atrazine
Sharpen 2.85 SC	saflufenacil

Evaluating Tolerance of Interseeded Cover Crops to Pre-Emergent
Herbicides for Corn Production in the Mid-Atlantic

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¹Penn State University, ²USDA-BARC, ³Cornell University

Penn State **Extension**

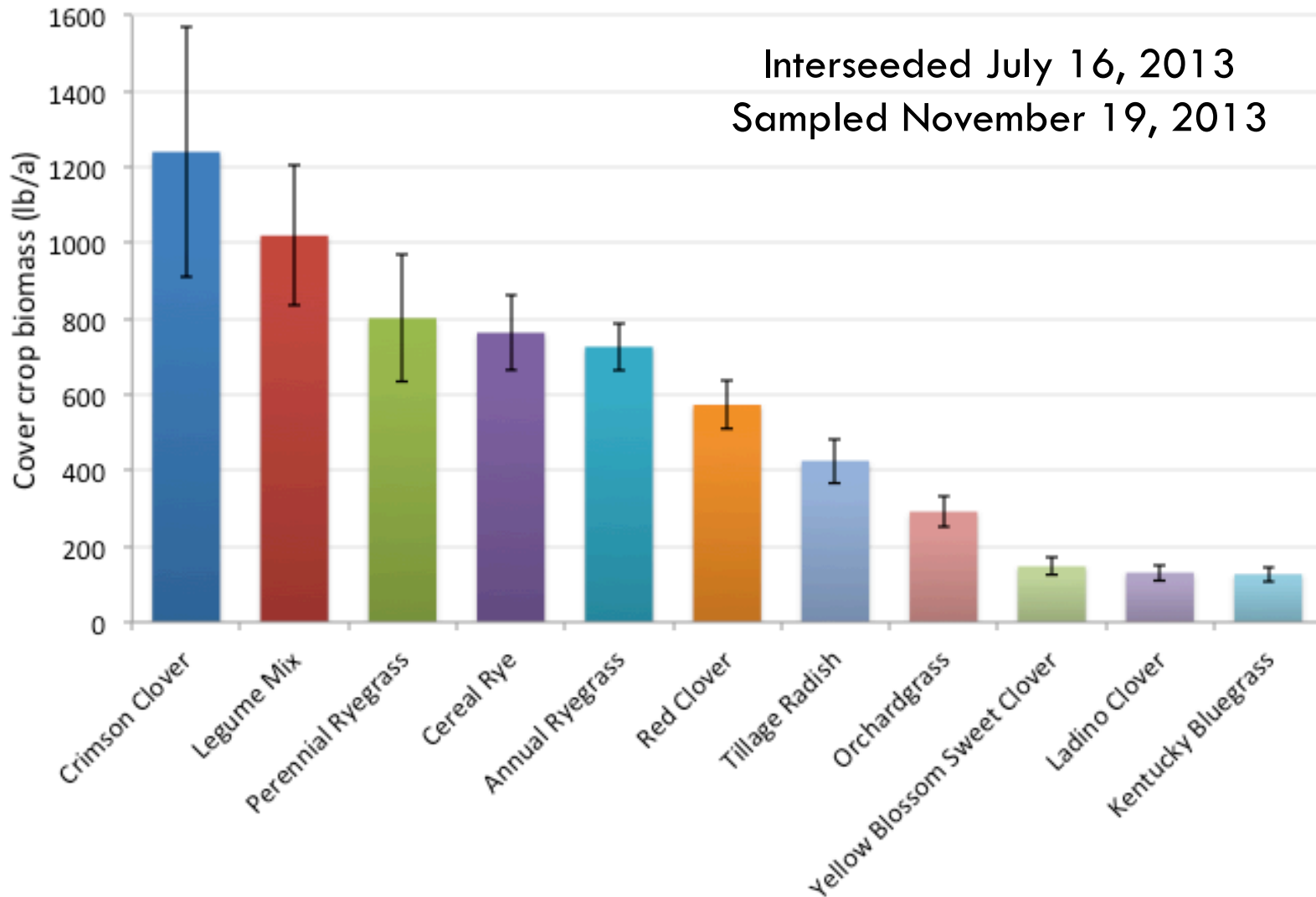


NRCS-CIG

Cover crop interseeding in soybean



Fall biomass from cc interseeded in soybean







Interseeded cover crops too late; damaged
soybean plants, and reduced yield





Potential benefits

- ❑ Establish cover crops in corn grain phase of rotation
- ❑ Avoid drilling through heavy stover after grain harvest
- ❑ Early establishment enables legume cover crop establishment and increases nitrogen scavenging in grass cover crops
- ❑ Opportunities for livestock grazing
- ❑ Potential to combine field operations (seeding, herbicide application, N sidedressing)

Potential drawbacks

- ❑ Cover crop can be outcompeted by corn crop
- ❑ Considerable crop damage on headlands
- ❑ Fewer herbicide options, challenging to suppress weeds but not cover crops
- ❑ Current 4-row unit is slow to cover acreage, and 6- or 8-row units would require larger tractor

Final thoughts

- ❑ Interseeding cover crops shows potential to increase management ease and profitability
- ❑ Invertebrate pests were a problem at several sites, and especially at sites with greater surface residue
- ❑ Grass-legume cover crop mixtures can respond to soil N conditions and self-regulate
- ❑ Results from multistate trials are being summarized and we should have more information soon