Cover Crop Seed, Selection, Mixtures and Establishment

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Placed 450+ Cover Crop Plots in 6 states in 2009-2014

All Cover Crops are better than no cover crops!

Goals will dictate Cover Crop choices

- Produce Nitrogen?
- Scavenge Nitrogen?
- Both?
- Reduce compaction?
- Reduce Erosion?
- Other?

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Many, Many Opportunities

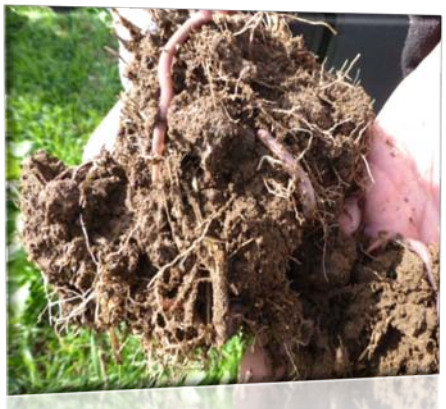
- After Cereal Grains
- Into Corn and Soybeans (Applied during growing season)
- After Corn Silage and Seed Corn
- Before and After Vegetable Crops
- Late-season Grazing

After Cereal Grains and some Vegetables

- Sudangrass
- Legumes
- Radish
- Brassicas
- Cereal Grains
- Annual Ryegrass
- **<u>Mixes</u>**

The “tool box” is wide open!

After Corn and Soybeans (and late Vegetables)



- Cereal Rye
- Annual Ryegrass(?)
- Radishes and Brassicas(?)
- Crimson Clover(?)
- Mixes

Limited options –Aerial application or Inter-seeding likely necessary

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After Corn Silage, Seed Corn (and Aug- Sept. harvested Vegetables)

- Cereal Grains
- Annual Ryegrass (?+)
- Radishes and Brassicas (?+)
- Crimson Clover (?+)
- Mixes

Aerial application or
Inter-seeding may be necessary

After Wheat with Manure Applied

Annual Ryegrass + Forage Turnip
2012 yield + 70 bu/a compared to no cover crop
(severe drought year)

Should we plant mixes??

- Usually
- How many species?
- What are benefits?

What species work best in mixes or as mono-cultures

- Crimson Clover
- Radishes
- Winter Peas
- Spring Peas
- Cereal Grains
- Sunn Hemp
- Hairy Vetch
- Chickpea
- Cowpea
- Phacelia

Best used in Mix

- Sudangrass
- Sorghum x Sudangrass
- Buckwheat
- Medium Red Clover
- Winter Cereal Rye (late)

Best used mono-culture

Benefits of Mixes

- Bio-diversity
- Different rooting structures
- Different exudates from different species
- Can have increased earthworm activity
- Possibly produce and scavenge Nitrogen
- Can better reduce erosion
- Greater *Flexibility* for producer
- No – one species is "perfect"
  - neither is any mix "perfect" ☺

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How many species in a Mix?

- 2? Common Mixes:
  - –Oats+Radish; CC + Radish; Peas + Radish; Vetch+CR
- 3? Common Mixes:
  - –CR+CC+ Radish; Oats+CR+Turnips; ARg+CC+Rad; CR+HV+Brassica
- 4? Common Mixes:
  - 2 cereals+Rad+Turnips; CR+legume+Rad+Turnips;
- 5+ Common Mixes:
  - Whatever! Add Sunn Hemp, Sudangrass, Cowpea, SxS, Phacelia, Mustards, etc…

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How many species are too many?

- It depends!
  - Most beginners want to keep it simple (Oats + Radish)
  - If you graze and plant in July/August then 5+ can be great!
  - If planting after grain corn or soybeans maybe just plant 1 species (Cereal Rye).

Do you have to have and “exotic” mixture to have “success”?

- NO
- NO
- NO

4 way mix of 2 cereals
and 2 brassicas- following wheat - before corn

Benefits of *less exotic* mixes

- Generally easier to plant
- Generally less expensive
- Generally meet specific goals

Risk of *less exotic* mixes or using straight species

- Less bio-diversity
- May potentially get lesser stand in problematic areas if wrong species used

Straight Phacelia planted into soybeans

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Benefits of *more exotic* mixes

- Greater bio-diversity
- May be more beneficial for grazing
- Provides better and more diverse coverage over whole field

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Risks of *more exotic* mixes

- Greater Cost
- More difficult to plant
- Shorter window to plant where all may be “effective” enough to cover extra cost
- Greater Cost

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USA – Midwestern Mixture Research

- Indiana 2012
- Minnesota 2014 (2 locations)

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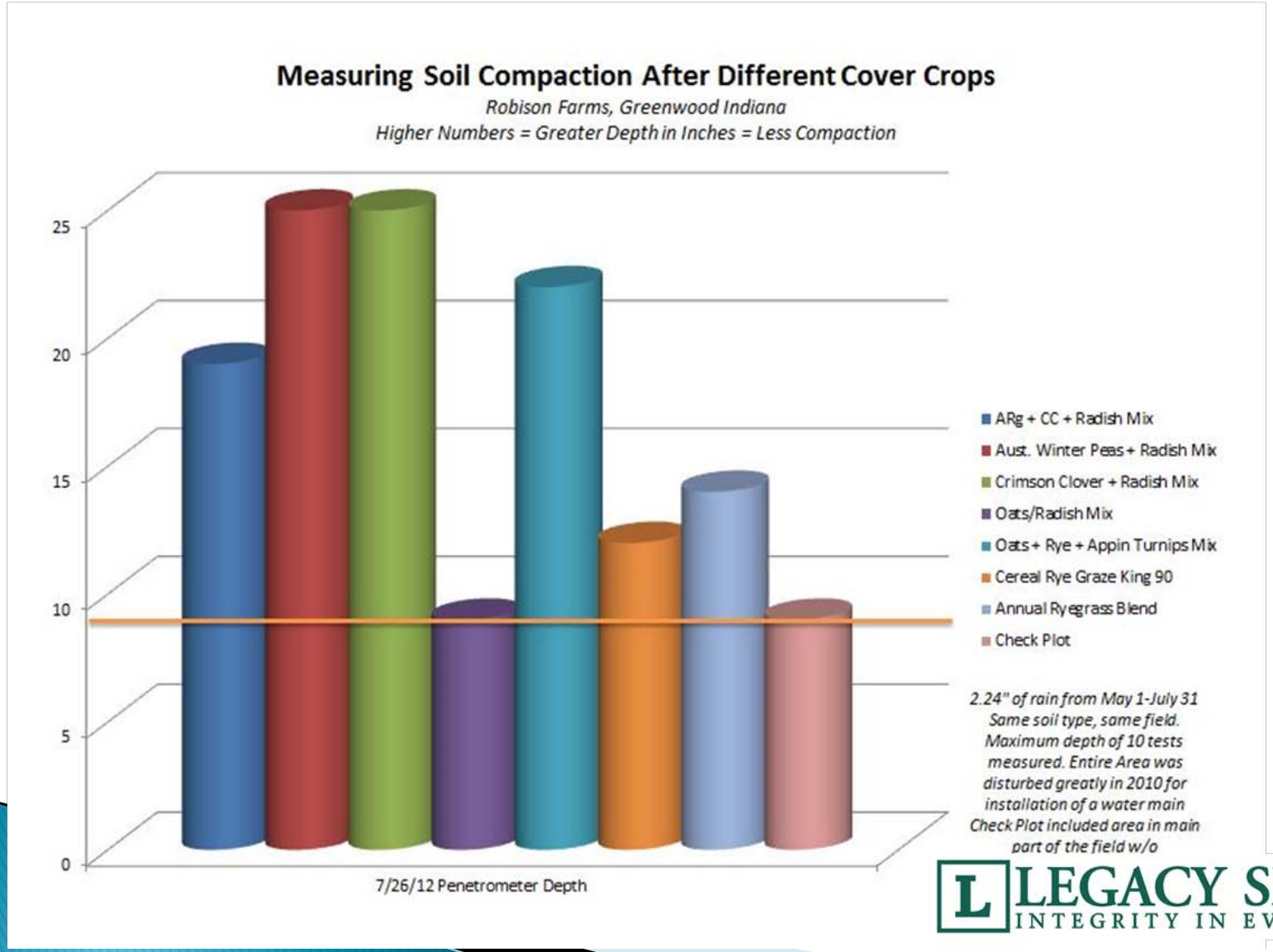
Cover Crops Can Reduce Compaction – No-till corn



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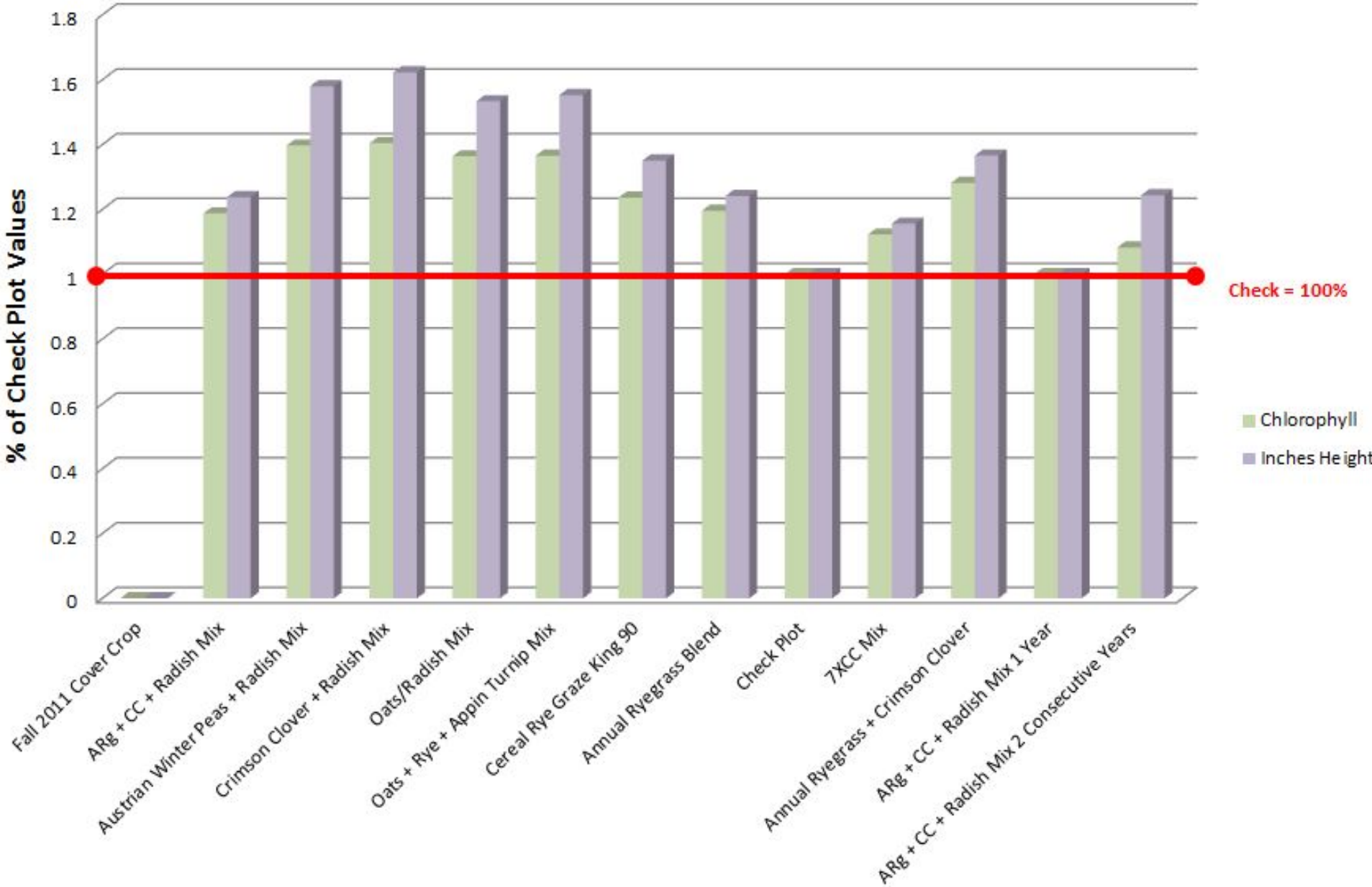
Cover Crop Plots Compared to Check Plots in 2012 Drought

Chlorophyll Units and Height in Inches June 20-July 26



2012 comparison (averages)–IN

Cover Crop	Average Yield	% over no cover crop
No Cover Crop	105.24	100%
Straight Species (2)	130.57	124%
Mixes (6)	146.44	139%

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Minnesota corn after cover crops

- Following Prevent Plant 2014 data
- Cover Crops planted in July or August 2013
- Cover Crops died over winter
- Excellent stands and growth

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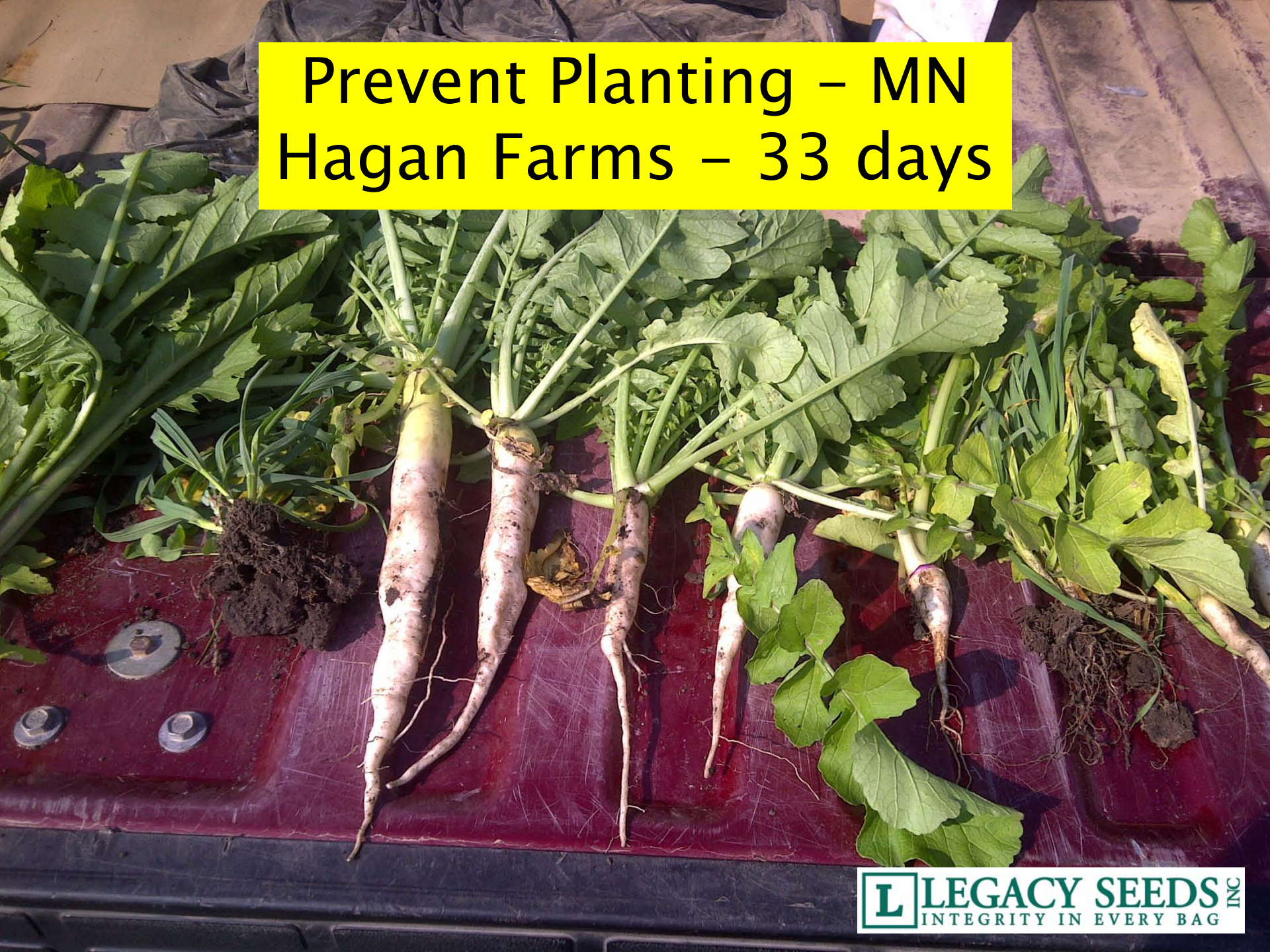
Prevent Planting – MN
Hagan Farms – 33 days
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Minnesota Corn Yield data 2014 – after prevent plant (Ellendale, MN)

3 way (no legume)	214.1 bu/ac.
2 way (cc+Rad)	210.7 bu/ac.
4 way (cc+Rad+Turnip+ARg)	208.8 bu/ac.
3 way (cc+ARg+Rad)	206.8 bu/ac.
3 way (CR+cc+Rad)	204.8 bu/ac.
3 way (Oat+brassica+clover)	200.4 bu/ac.
2 way (Pea+Rad)	199.7 bu/ac.

- All species died over winter
- Cover crop planted ~8/1/13
- **Field average 208.50 +20bu/acre vs no cover crop fields**

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Minnesota Corn Yield data 2014 – after prevent plant (Plainview, MN)

- Check strips –Italian Ryegrass 191.17 Ave.
- Straight Legume (3 plots) 183.15 Ave.
- Mixes 183.42 Ave.
  - (6 plots –various mixes 2-4 species)

- All species died over winter
- Cover crop planted 7/23/13

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Ontario testimonial 2014

- Blake Vince +40 bu/acre with 10 way mix vs. straight cover crop Radish
  - –Wayne DeBoer General Seed

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Let's talk about Grazing…

- Best value in cover cropping is with animal production
  - Sequester Nutrients
  - Recycle Nutrients
  - Excellent Rate of Gain potential (can have up to 3.5#/head/day in winter with grazing cover crops after wheat)
  - Reduces compaction
  - Increases yield the following year

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Major Benefit of Grazing Cover Crops

- Extend the Grazing Season
- Less compaction than grazing stalks w/o cover crops
  - Virtually NO compaction

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Grazing Radishes and Turnips
Northern Indiana December

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Value of Grazing Cover Crops/acre

- Approximate cost/acre
- Seed + application – $100

- Potential Yield x forage value
(3T DM/Ac. x $100) + $300

- + Cattle weight gain (1-3.5#/head/day 120 days (1.5hd/ac)

- + Savings on Hay cost… PRICELESS!

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9-way Mix planted May 1, 2014

Chris Hollen - Indiana

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Chris Hollen– IN –grazing annual cover crop forages prepping land for permanent pasture

- cowpea, non-gmo soybean, sunflowers, German millet, proso millet, pearl millet, 2 types of sorghum-sudangrass and grazing corn

This IS NOT for every farm…but it can be awesome for some

When and How to Apply Cover Crops

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What Cover Crops to use with aerial application

- Annual Ryegrass
- All Cereal Grains
- Radishes
- Turnips
- Crimson Clover – into corn
- Hairy or Common Vetch
- Phacelia
- Sunflower
- Mixes of the above

What Cover Crops to avoid when using aerial application

- Peas
- Beans
- Sunn Hemp
- Crimson Clover –into soybeans
- Cowpea
- Chickpea

This is the proper time to apply cover crops into corn

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This is WAY too early!

(unless it is bone dry with no rain in sight)!

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Flown into Silage Corn – Waupun, WI area 22” rows (2 weeks before harvest)

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The proper time to fly into Soybeans (30's and 15's) – 7 ½ 's need to be more mature

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Sunlight makes a BIG difference

30's

7 1/2's

30" corn

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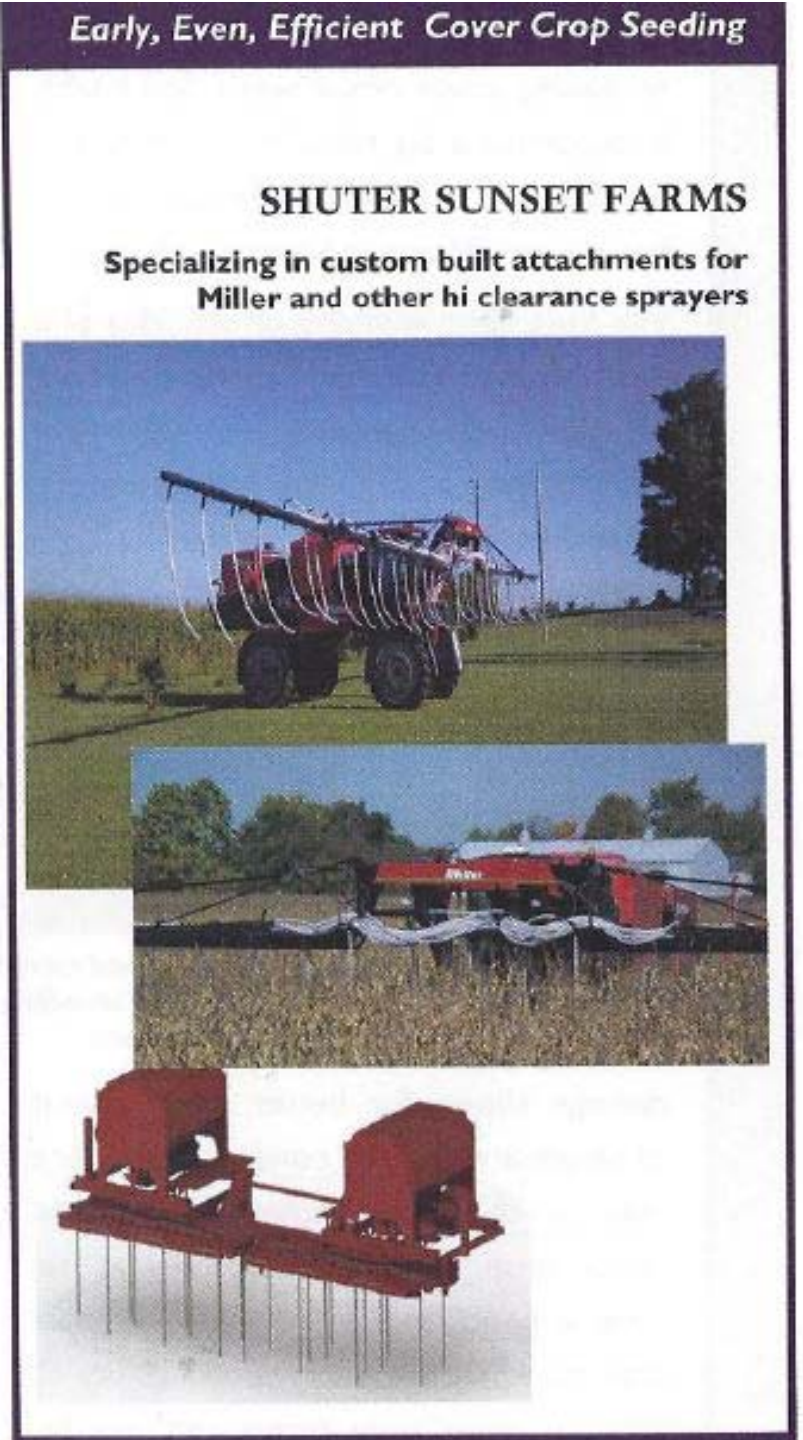

- Entrepreneurs can start a "new business" of applying cover crops into standing corn and soybeans!
- Apply into smaller fields than plane can, very good stands achieved, cost effective per acre

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Mixes– What should you do now?

- Know producer's goals
- Know producer's management style/ability
- Know CHEMICAL PROGRAM
- Know what crop is coming next
- Know producer can apply
- Know the season and opportunity

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