Cover Crop Selection and Management Strategies

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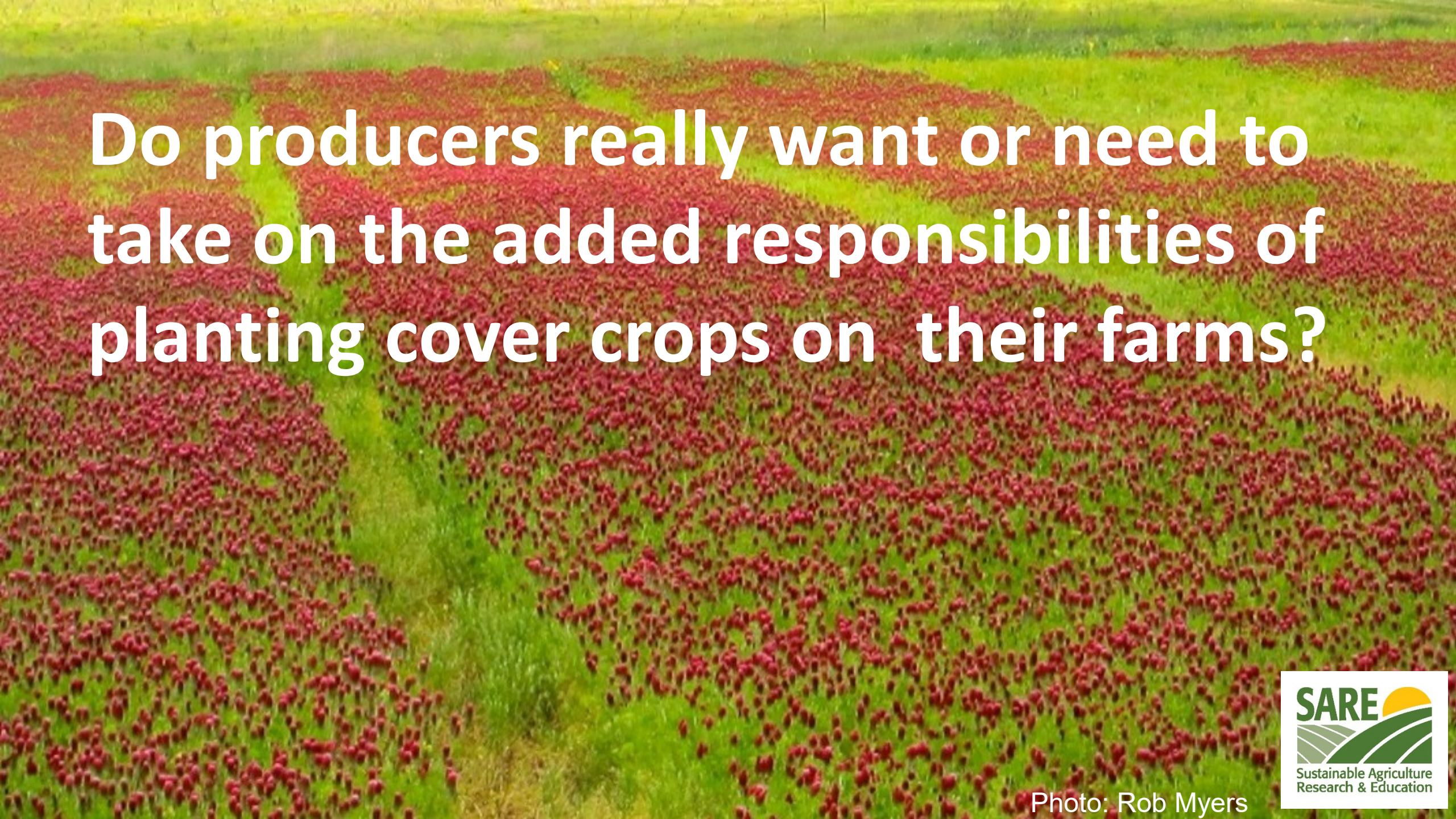
Do producers really want or need to take on the added responsibilities of planting cover crops on their farms?
Photo: Rob Myers
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The Good and the Bad of Cover Crops

- Erosion control
- Soil moisture
- Nutrient scavenging/cycling
- Biodiversity
- Reduced herbicide use
- Combatting compaction
- Increased soil fertility
- Increased yields
- Improved soil health
- Incentives, ie. EQIP, CSP
- Soil temperature buffer

- Costs associated with seed, equipment and planting
- Timing of planting due to harvest of cash crops
- Can immobilize nitrogen for following cash crop
- Disease and insect problems due to green bridge
- Cooler and slower drying of soil
- Competition for water
- Excess moisture post termination (soil moisture management)
- Allelopathy
- Residue/planting issues

What are the goals for the cover crop?

Soil erosion
Go for fast cover, good rooting, persistent growth
– cereal rye, oats

Soil compaction
Cover crops that are deep rooting or taproots
– annual ryegrass, oilseed radishes, sunflowers

Nitrogen fixation
Limited to legumes
– hairy vetch, crimson clover, Austrian winter peas, sunn hemp, cowpeas

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Goals for the cover crop (cont'd)

Nitrogen scavenging
– radishes, cereal rye

Disease/nematode suppression
– Brassicas (e.g. radish), or just good rotation practices – ideally don't use a grass cover crop before or after a grass cash crop (corn)

Weed control
– cereal rye, oats (allelopathic and good at smothering weeds)

Pollinator habitat and food source
– buckwheat, clovers, diverse mixes

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Are covers the possible solution to all of these issues on the farm?

No, but they can be a beneficial production management tool to help solve issues if properly selected and managed.

Which cover(s) should I plant?

Species	Nitrogen Source	Weed Suppression	Erosion Control	Subsoiler	Quick Growth	Forage	N Scavenger	Residue Persist.	Insect Nemat. Issues	Crop Disease	Allelop.
Hairy Vetch	E	G	G	G	F	G	F	F	MIN	NO	G
Crimson Clover	E	VG	VG	F	G	E	G	G	YES	MIN	F
Subt. Clover	E	E	VG	P	G	VG	F	VG	YES	MIN	VG
Red Clover	E	VG	G	VG	F	E	G	F	MOD	MIN	G
Berseem Clover	E	E	VG	F	E	E	VG	G	MIN	MIN	F
Winter Peas	E	G	VG	F	VG	VG	F	F	MIN	MOD	F
Oats		E	VG	P	E	G	VG	G	MIN	MIN	VG
Rye		E	E	F	E	G	E	E	MIN	MIN	E
Wheat		VG	VG	G	VG	VG	VG	VG	MOD	MOD	F
Radish		E	VG	E	VG	G	E	F	MIN	NO	VG
S-Sudan		VG	E	E	E	VG	E	VG	MIN	NO	E

REMEMBER….

- Legumes: Most N fixation takes place in early to late spring growth; however higher C:N ratios can result in less immediate N for following crop.
- Cereals: Nutrient uptake is most during late-tillering and around jointing.
- Brassicas: Nutrient uptake is during early season growth. Early leaf shedding indicates stress and release of N during this time can be lost to leaching.

Mono-species or Multi-species?

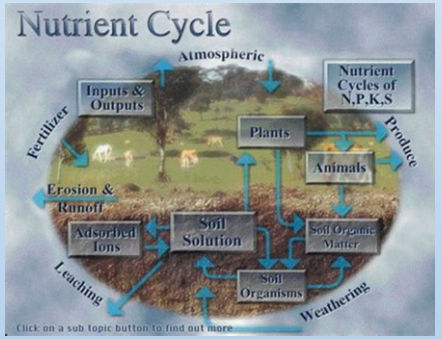
- You can find research to support both
- Start small if you are a beginner
- Your decision based on your operation
- May be best starting simple with 1 or 2 species

- Don’t expect a silver bullet that will fix everything you think it should !!

Factors to consider in selecting a cover crop

1) What time of year will the cover crop be needed?
2) What are the goals for the cover crop use?
3) What planting method will be used?
4) How easy is the cover crop to establish?
5) What kind of soils are present?
6) What are the cash crops in the rotation?
7) What does the seed cost and how available is it?

A few reasons producers decided to integrate cover cropping in their production systems



Erosion Control


2015/02/18

Weed Suppression


75#/A Cereal Rye +
1.33 # Dual Magnum 2 wks post cover emergence
4 Weeks prior to soybean planting


No treatment or cover crop
4 Weeks prior to soybean planting

TAKEAWAYS AFTER 2 YEARS OF RESEARCH

1. Spike application (0.75” hypocotyl) can show more visual injury than at 1” if heavy rainfall occurs after application, but cereal rye and Cosaque oats biomass production is unaffected in spring.
2. Delaying application to 1” allows time for Italian ryegrass to emerge.
3. The lowest injury occurred with herbicides s-metolachlor (Dual Magnum and generics), Anthem Flex, and metribuzin at 3 oz/A
4. The combination of s-metolachlor and cereal rye (spike stage application) reduced Italian ryegrass tiller and seedhead production >95% in spring.
5. Cover crop alone provided 50-65% reduction, s-metolachlor 60-70% , tiller and seedhead production.
6. Italian ryegrass seed survival in soil is 18 months.

ELBON RYE

FLORIDA 401

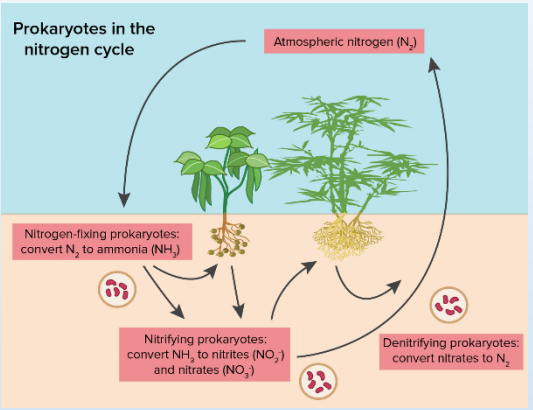
ELBON RYE 70#/A

COSAQUE OATS 35#/A
ELBON RYE 35#/A

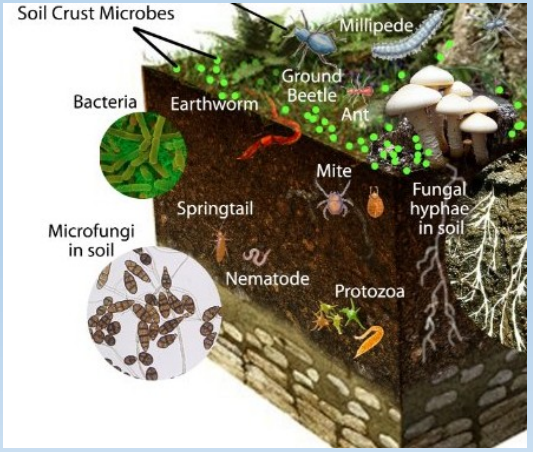
ELBON RYE 70#/A

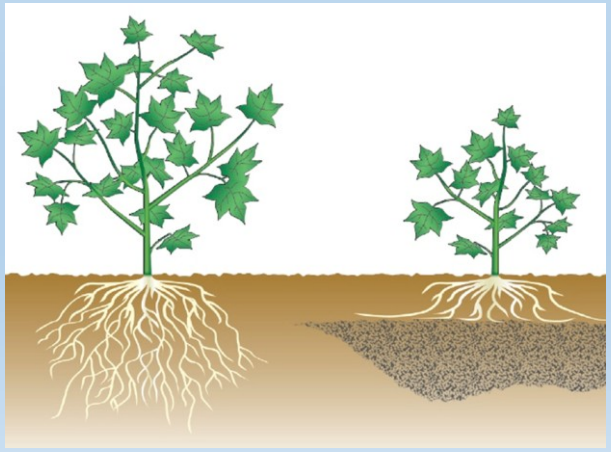
COSAQUE OATS 35#/A
ELBON RYE 35#/A

Improved Nutrient Cycling and Use Efficiency



- Nitrogen producers
- Nitrogen/nutrient Scavengers
- Serve as sub-soilers to break up compacted soil over time
- Help build organic matter and sequester carbon
- Provide food for microorganisms that stabilize soil aggregates
- Increased soil permeability and soil aeration
- Reduce nutrient leaching and transport off-site





Plant Food Removed in Harvested Crop and that remaining in crop residue

Crop	Yield/Ac	N,lb	Phosphate,lb	Potash,lb
Corn	180 bu	**135**	**79**	**52**
Stalks, etc.		*105*	*23*	*188**
Cotton	2 bale	**64**	**28**	**40**
Residue		*96*	*20*	*100**
Rice	200 bu	**110**	**58**	**36**
Straw		*34*	*19*	*179**
Sugarcane	40 ton	**80**	**50**	**140**
Residue		*88*	*30*	*124**
Soybeans	60 bu	**240**	**48**	**84**
Residue		*96*	*9*	*132**
Wheat	70 bu	**81**	**39**	**24**
Straw		*49*	*8*	*118**

A general expectation of planting the cover crops over time is to ……..

Improve soil quality, or how well a soil can perform *what we want it to do*. Influencers affecting soil function improvement are:

- **Biological factors**
- **Organic matter**

With a goal of …….

- Improving yields
- Increase economic returns
- Improve crop quality
- Reducing soil loss
- Reducing nutrient loss from leaching or erosion

The ultimate expectation of planting cover crops over time is to ……..

Enhance soil health, where the living parts such as the fungi, bacteria, nematodes and insects interacting with the environment results in the *state of a soil meeting its range of ecosystem functions as appropriate to its environment.*

- **Maintenance or improved biodiversity**
- **Water quality**
- **Nutrient cycling**
- **Biomass production**

Note the new focus in production: Regenerative

New Cover Crop Projects

- Effect of Nitrogen Fixation in Soybeans Following Hairy Vetch as a Cover Crop
- Utilizing Triticale and Cereal Rye as a Deer Deterrent in Soybeans
- Utilizing Early Maturing Cereal Rye as a Cover Crop in Corn
- Utilizing Early Maturing Cereal Rye to Suppress Fall and Spring Italian Ryegrass Emergence, Growth and Seed Production

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Thank you!

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