Strategies for Innerseeding Cover Crops into Corn

Maximizing your Cover Crop Benefits with Interseeding

Background

- We had tilled our ground from 1874-2015(141 years)
- We planted our first Cover Crop in 1998.
- We started doing No-till and/or Strip-till in 2013. My Covers have made my reduced tillage work better!
- First Organic field in 2017. 1/3rd of my acres are Organic and 2/3rd No-Till.
- We have a 50 cow/calf and 50-100 grass finished feeders that can graze every acre of our 800ac Farm before or after our cash crop.(dual income)
- We did all of our drainage ourselves, so I have spent a lot of time looking at our soils from below.

Cash Crops: 1995-2010

Conventional: Full tillage and Chemical

- Corn
- Soybeans
- Sweetcorn(one field)
- Little bit of Alfalfa
- Plant a field of Winter Rye
- Cattle: 500 head feedlot

Cash Crops: 2010-2025

- **60% No-Till:** Corn, Soybeans, Sweet Corn, Canning Peas, Sunflowers, Cereal Rye, Alfalfa and Cover Crops with Cattle Grazing or Forage.
- **40% Organic:** Corn, Soybeans, Sweet Corn, Sunflowers, Oats, Buckwheat, Hemp-Grain/Fiber and CBD and Cover Crops with Cattle Grazing or Forage.
- Grass Finished Cattle / Pigs / Chickens

My Attributes

- I have planted Cover Crops for 25+ years.
- I had Canning crop acres that gave me options.
- I have cattle that made forage a necessity.
- Following Peas I had options to feed cattle and the Soil.
- Large Cocktail mixes became common every year.
- I always ask “WHY”

I realized how much my soil had improved with my big multi-species CC blends that I knew I had to get more growth/diversity in my corn/soybean fields: Interseeding!

Interseeding: Rethinking the way we FARM?

What do I need to think of to have Success Interseeding?

1) Goals
2) Chemicals
3) Cash Crop Species
4) Cover Crop Varieties
5) Cash Crop: past/present/future
6) Overwinter or Not?
7) Forage vs Weed control
8) Equipment
9) Planting, Timing
10) MOISTURE!!

1)Goals

- Why am I interseeding?
  - Soil Health Long term
  - Grazing/Forage short term
  - Weed control short term
  - Erosion control short term
  - Capturing/Unlocking Nutrient$$. Long term
  - Increase my ROI on my best asset! Long term

Interseeding Covers-

Be flexible and take what Mother Nature gives you. Adapt to your: conditions, environment,

financials

and the

TIMES!

2) Chemicals

- Very IMPORTANT! One of the biggest mistakes.
- Most Pre's have harder plant/forage restrictions.
- The more species it claims to kill, the more problems you will have. Residuals!

Chemical Labels

- Looking for:
  Rotational Crop Restrictions
  - Follows the Tank Mixing information.

- Looking for:

  Crop-specific Information

  (Corn/Crop Restrictions)
  - Plant and Forage information

Cleaning Spray Equipment

To avoid injury to sensitive crops, drain and clean application equipment thoroughly using a strong detergent or commercial sprayer cleaner according to the manufacturer's directions. Triple rinse equipment before and after applying this product.

Tank Mixing Information

Armezon® herbicide may be applied sequentially or tank mixed with other herbicides as part of a complete weed control program. Tank mix recommendations are for use only in states where the sequential or tank mix product and application site are registered. Refer to **Crop-specific Information** for more details and for specific tank mix restrictions. Read and follow the applicable restrictions and precautions and **Directions For Use** on all products included in any tank mix. **The most restrictive labeling applies to tank mixes.**

Rotational Crop Restrictions

The following rotational crops may be planted after applying **Armezon** at the specified rate. Planting earlier than the specified interval may result in crop injury. Avoid overapplication by minimizing overlap of spray swaths and by switching off spray boom when turning (end rows).

For rotational crops following the use of sequential applications of **Armezon**, the rotational interval begins after the last **Armezon** application.

Rotational Crop	Rotational Interval (months)		
	Armezon Application Rate (fl oz/A)		
	0.5	0.75	1.0 to 2.0***
Corn (all)	0	0	0
Sugarcane	0	0	0
Axant™ Flex cotton	0	0	0
Cereal grains	3	3	3
Grass grown for seed	3	3	3
Rice	3	3	3
Alfalfa	9	9	9
Cotton (non Axant Flex)	9	9	9
Grain sorghum	9	9	9
Peanut	9	9	9
Potato	9	9	9
Soybean	9	9	9
Sunflower	9	9	9

(continued)

Rotational Crop *(continued)*	Rotational Interval (months)		
	Armezon Application Rate (fl oz/A)		
	0.5	0.75	1.0 to 2.0***
Canola	9	9	18
Lima bean, succulent	9	9	18
Dry beans[1]	9	9*	18**
Pea	9	9	18**
Snap/Garden bean	9	9*, †	18
Sugar beet	9*	9*	18**
All Other Crops	18	18	18

[1] For cranberry beans in Idaho, Utah, and the area east of the Cascade Mountains in Oregon and Washington, follow the guidelines for snap/garden bean.
* 18 months for the following states: Colorado, Michigan, Minnesota, Montana, Nebraska (west of Highway 83), North Dakota, South Dakota, Wisconsin, and Wyoming
** 9 months for Idaho, Oregon, and Washington
† 18 months for Idaho, Utah, and the area east of the Cascade Mountains in Oregon and Washington.
*** Rotational crop injury may occur (other than for corn, sugarcane, or **Axant Flex** cotton) when more than 1.0 fl oz/A **Armezon** (0.022 lb topramezone per acre) per year is applied to soils with pH greater than 7 and/or under conditions with below normal seasonal precipitation.

Crop-specific Information

Corn
(field corn, popcorn, seed corn, sweet corn)

Apply **Armezon** postemergence on all corn types including conventional, **Roundup Ready®**, and **LibertyLink®** hybrids. In addition, **Armezon** may be applied on inbred lines used in field corn, popcorn and sweet corn seed production. Refer to seed company instructions before use on inbred lines.

Armezon may be used in tank mixes or sequential applications with other herbicides registered for use in corn. If **Armezon** is tank mixed with other herbicides, follow label restrictions for the most restrictive tank mix products. It is the pesticide user's responsibility to ensure that all products are registered for the intended use. Read and follow the applicable restrictions and limitations and directions for use on all product labels involved in tank mixing. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.

My Non-GMO Chemicals

Pre Emergence

- Dual/Outlook
- Surpass/Harness
- Verdict*
  - No forage

POST

- Impact
- Status
- Liberty Link, Glyp….
- Atrazine*
  - less then .5lb

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- Banding chemicals is a great option. What are the Ripple effects?

Banding Chemicals

The Ripple Effect

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- Organic has an advantage.


Gandy
Orbit-Air

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- Banding chemicals is a great option. What are the Ripple effects?
- Organic has an advantage.
- Seeds are life and Chemicals are made to kill!

Remember:

Every decision on your Farm and in your Life is an opportunity to do GOOD or BAD!

3) Corn Varieties/Crop Species

- Tall vs short

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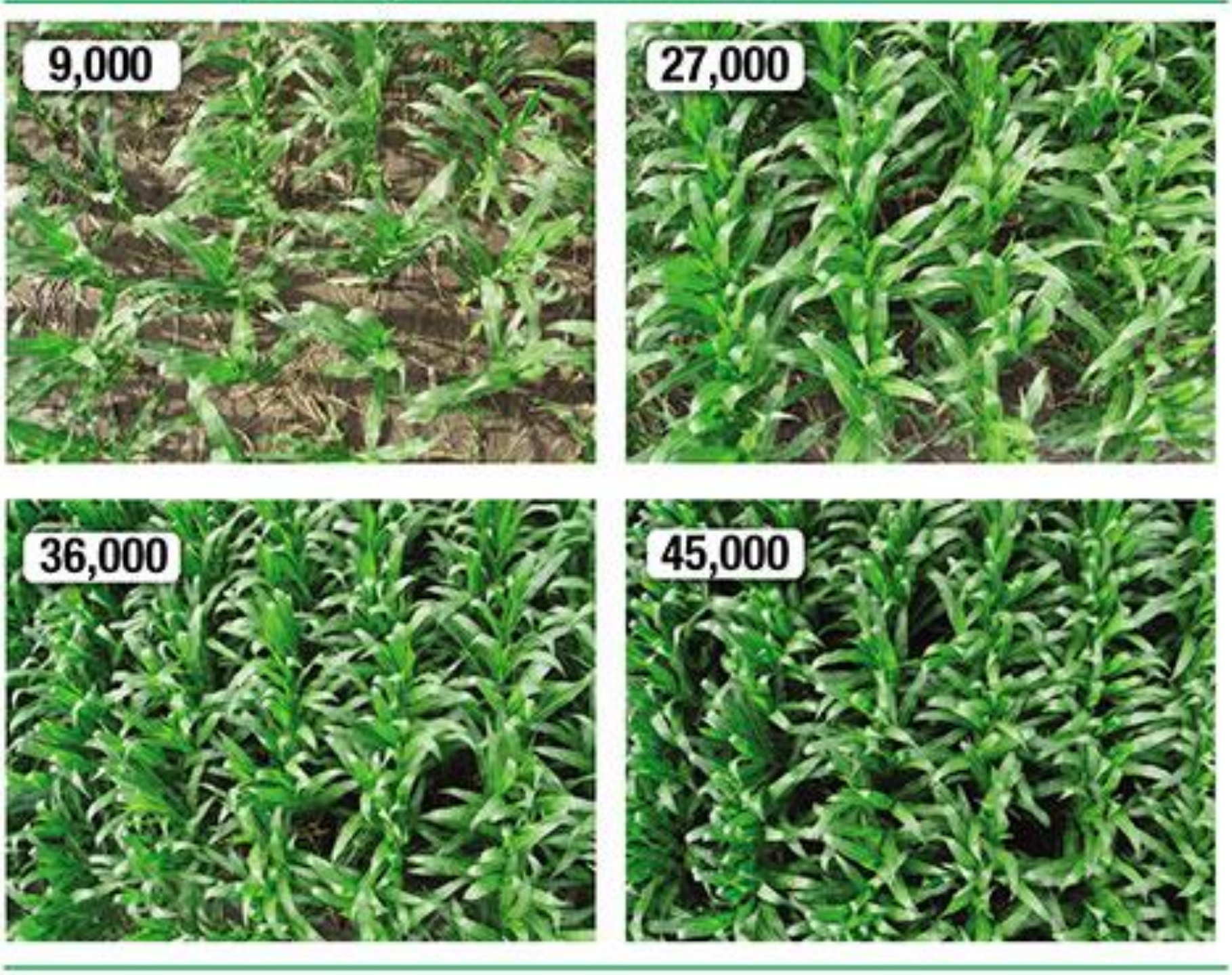
- Tall vs short
- Population: high vs low

Populations

Corn 28k-44k

SWC 18k-25k

Sunflower
18-26k

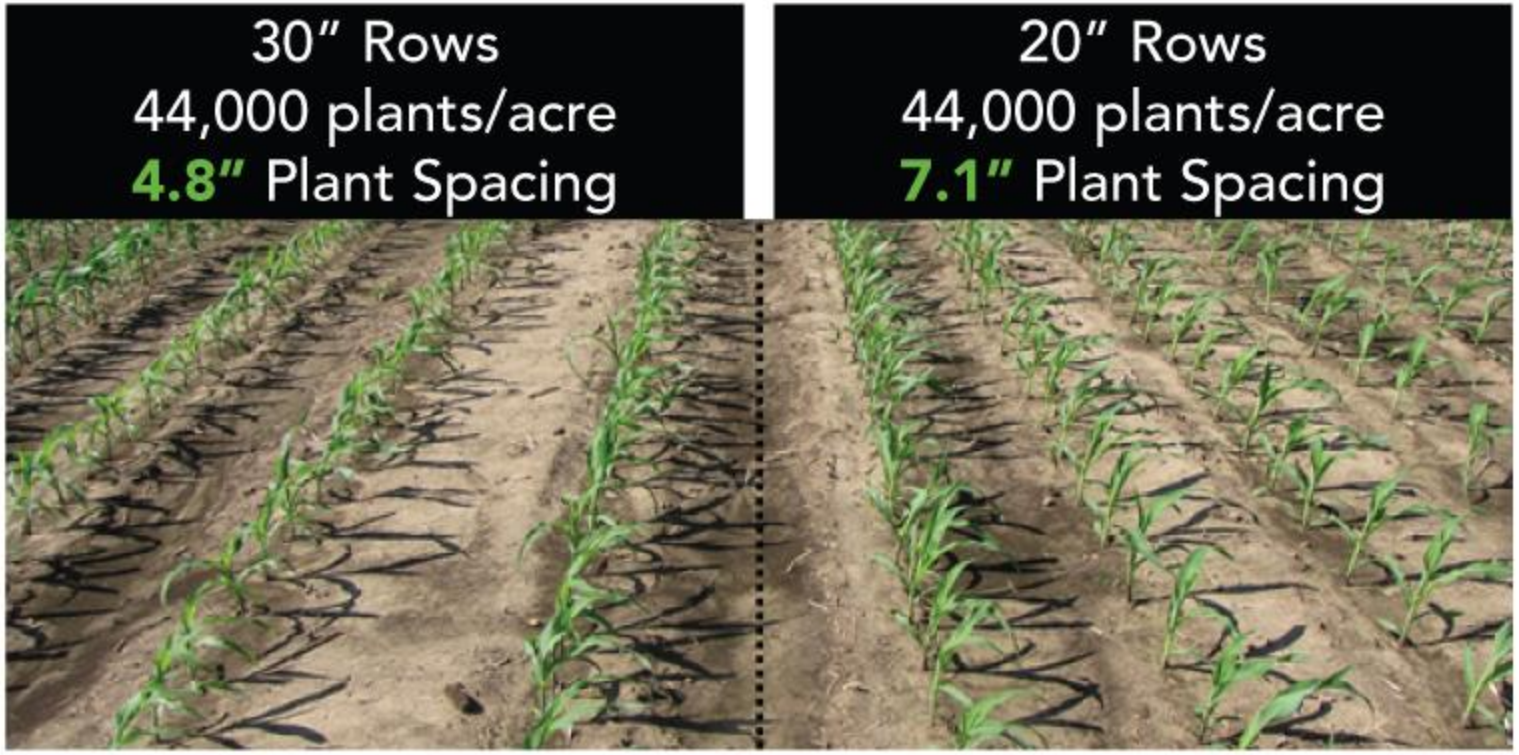


3) Corn Varieties/Crop Species

- Tall vs short
- High population
- Row spacing: 15”- 60”

Row spacing

- 15”
- 22”
- 30”
- 36”
- 44”
- 60”
- Twin rows



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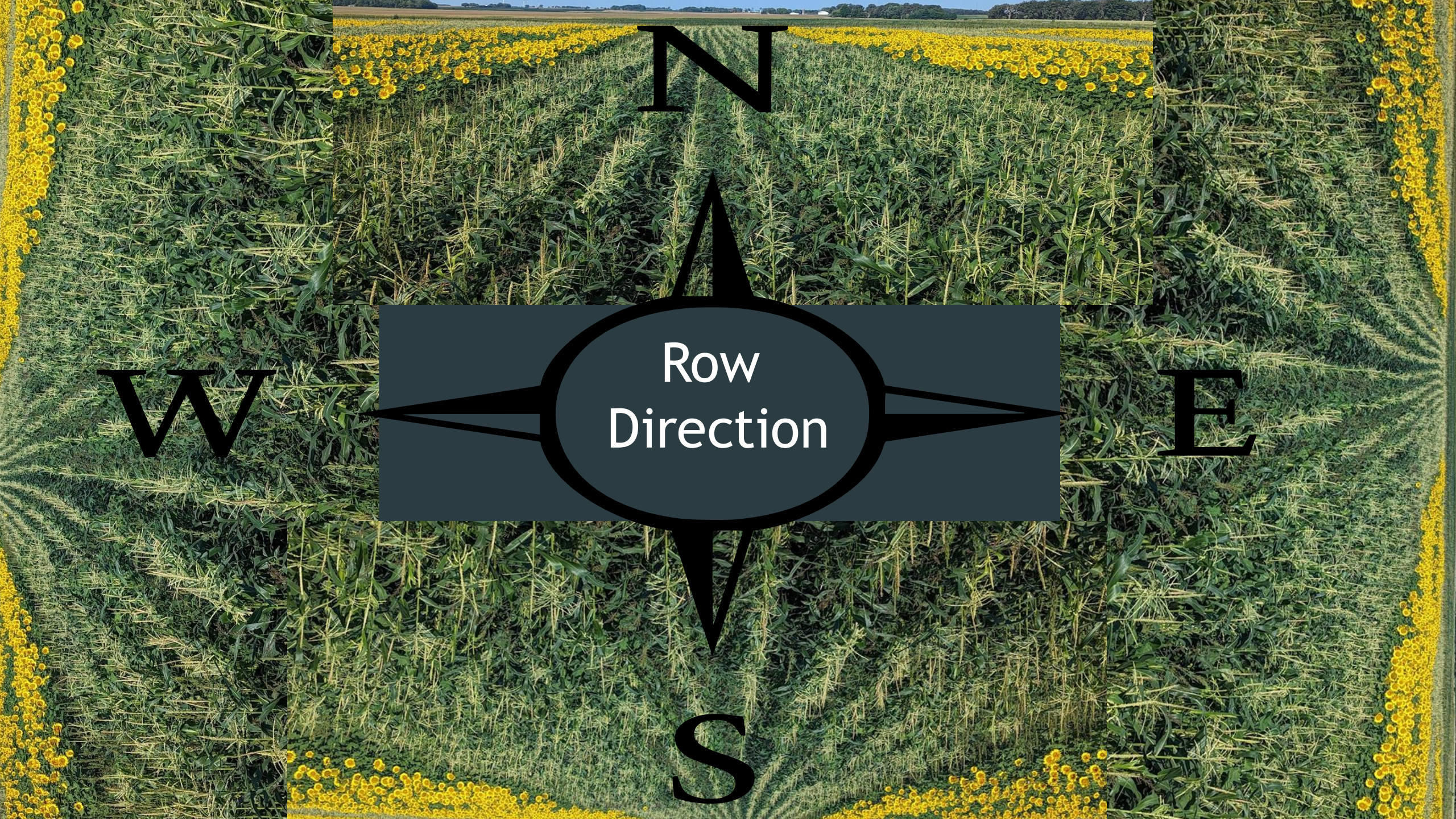
N
W
E
S
Row
Direction

3) Corn Varieties/Crop Species

- Tall vs short
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- Row spacing: 15”- 60”
- Plant/Leaf statue
- Row directions
- Cash Crop species

Cash Crops I Interseed into and Timing:

- Conventional(No-Till) Corn (Early June)
- Organic Corn (Early July)
- Conv. & Organic Sweet Corn (mid to late summer)
- Conv. Sunflowers (Late June)
- Organic Sunflowers (mid-late July)
- Conv. & Organic Soybeans (September 1st)
- Conv. & Organic Oats (Early Spring)

3) Corn Varieties/Crop Species

- Tall vs short
- High population
- Row spacing: 15”- 60”
- Plant/Leaf statue
- Row directions
- Cash Crop species
- ???

4) Cover Crop Species

- How many species?

Diversity of Species

- Having the right plants working together. Help survive drought, disease, extreme weather and temperature. Like us, they are stronger together than alone.
- Or is it more important to get the soil relearning how to work with multiple plants in harmony. Since it is a living entity and for the last 150 years it had to survive on mono crops. Get it back to real nature.
- I am usually in the 4-7 range. Why?

What I like to Interseed

Bounty Annual Ryegrass*
Bayou Kale*
Red Clover *
Buckwheat*
Dwarf Essex Rape Seed
Common (Cahaba) Vetch
African Cabbage
Enricher Radish
Austrian/Cow Pea
Purple Top Turnip
Oats
Flax

4) Cover Crop Species

- How many species?
- Winterkill or survive?

To Live or Die?

Winter Kill

- Beginning stages of Soil Health Practices.
- Easier Planting the next year.
- Earlier release of Nutrients.
- Lowest ROI

Overwinter

- Further along on your Soil Health journey.
- Need the right species to co-exist with the next seasons cash crop.
- Later and more complex recycling of Nutrients.
- Biggest ROI

4) Cover Crop Species

- How many species?
- Winterkill or survive?
- Grasses, Legumes, Brassicas and Pollinators and WHY?

Cool Season Grasses/Cereal Grains

- Pretty east to get established.
- Can live long into the fall.
- Winter cereals do not have much above ground growth in the fall but great below ground.
- Excellent spring growth!
- Nitrogen scavenger.
- Can be a great alternative forage.
- Fibrous root system

Legumes: Why do we use them?

- Can capture/produce Nitrogen under the right conditions if time is allowed.
- Most have a high seed count.
- Need good seed-to-soil contact.
- Can make a great forage, but if you remove it, you remove nutrients!
- Be practical with the application, more is not always better.

What do we get from Brassicas?

- Capture N, P, K and micros from the soil.
- Great at penetrating compaction.
- Helps build soil structure.
- Can be a great feed source when balanced.
- Can be a natural control for pests.
- High seed count: great choice in a mixtures.
- When soil is dry, they germinate the easiest.
- Great moisture source when grazing!

Pollinators: Multiplying your Workforce

- Rethink what actually benefits you.
- Save on inputs that make you reliant on them $$.
- Saving a delicate Food system, Bees…
- Giving your Soil the chance to reach it's potential.
- For every 1 bad insect killed, over 700 good ones are also terminated!

4) Cover Crop Species

- How many species?
- Winterkill or survive?
- Grasses, Legumes, Brassicas and Pollinators and WHY?
- Don’t compete with the Cash Crop!

Don’t outcompete your Crop!

- Corn is a warm season grass = Don't plant WSG!
  - Cool season grasses are okay. Be careful of Cereal Rye. I use Bounty Annual Ryegrass!
- Warm and cool seasons of legumes, brassicas and pollinators.
- Plant early(V3-V6) but give the cash crop a stress(weed) free time period.
- Germination can take 3-14 days depending on weather and species.

4) Cover Crop Species

- How many species?
- Winterkill or survive?
- Grasses, Legumes, Brassicas and Pollinators and WHY?
- Don’t compete with the Cash Crop!
- Should be Heat and Shade tolerant.

Heat & Shade Tolerance/Effects

- Focus on these to help with success.
- Your seed provider BETTER have the info.
- Species can and will adopt to the environment. Ex: Long stalks with earlier planting dates.

- Plants that are planted early.
- Heat/Shade effects all plants differently.

4) Cover Crop Species

- How many species?
- Winterkill or survive?
- Grasses, Legumes, Brassicas and Pollinators and WHY?
- Don’t compete with the Cash Crop!
- Should be Heat and Shade tolerant.
- Warm and Cool Season species.

Warm and Cool Species

- Warm Season species will thrive in your mix. Stay away from using the same as your cash crop!
- Think about the statue of the plants. Ex?
- Cool Season species can survive if enough shade from the Sun.

4) Cover Crop Species

- How many species?
- Winterkill or survive?
- Grasses, Legumes, Brassicas and Pollinators and WHY?
- Don’t compete with the Cash Crop!
- Should be Heat and Shade tolerant.
- Warm and Cool Season species.
- Mixing Species.

Mixing Species

- Start with a base species:
  - Compliment with diversity.
  - Adjust to your environment & weather.
- Start with simple and work up from there.
- I usually go 80% of base species and adjust from there.

Some of My Mixes
Next years crop is Nitrogen User

- Bounty Annual Ryegrass/ARG 6 lbs.
- Red Clover 4 lbs.
- Bayou Kale 1 lbs.
- PTT/Enricher Radish .5 lbs.
- Buckwheat 5 lbs.
- Flax 2 lbs.

Some of My Mixes
Next years crop is a Legume

Bounty Annual Ryegrass/ARG	8 lbs.
Crimson Clover	4 lbs.
Bayou Kale	1 lbs.
Dwarf Essex Rapeseed	.5 lbs.
Buckwheat	3 lbs.

Some of My Mixes
Grazing Purposes

- Bounty Annual Ryegrass/ARG 10 lbs.
- Red Clover 2 lbs.
- **Mihi Persian Clover** **2 lbs.**
- Bayou Kale 1 lbs.
- Buckwheat 3 lbs.
- PTT .5 lbs.
- Rapeseed .5 lbs.

5) Cash Crop & Cover Crop: Past/Present/Future

- Is it what I want in the spring?

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- Take advantage of your cover crops.

5) Cash Crop & Cover Crop: Past/Present/Future

- Is it what I want in the spring?
- Grow your Nitrogen/Weed control/IPM
- Take advantage of your cover crops.
- Over your cash crop rotations, do NOT miss the opportunity to have all of the plant families grown!
- Playing Chess!

6) Increasing Survival

- Good fall growth. Plant early!

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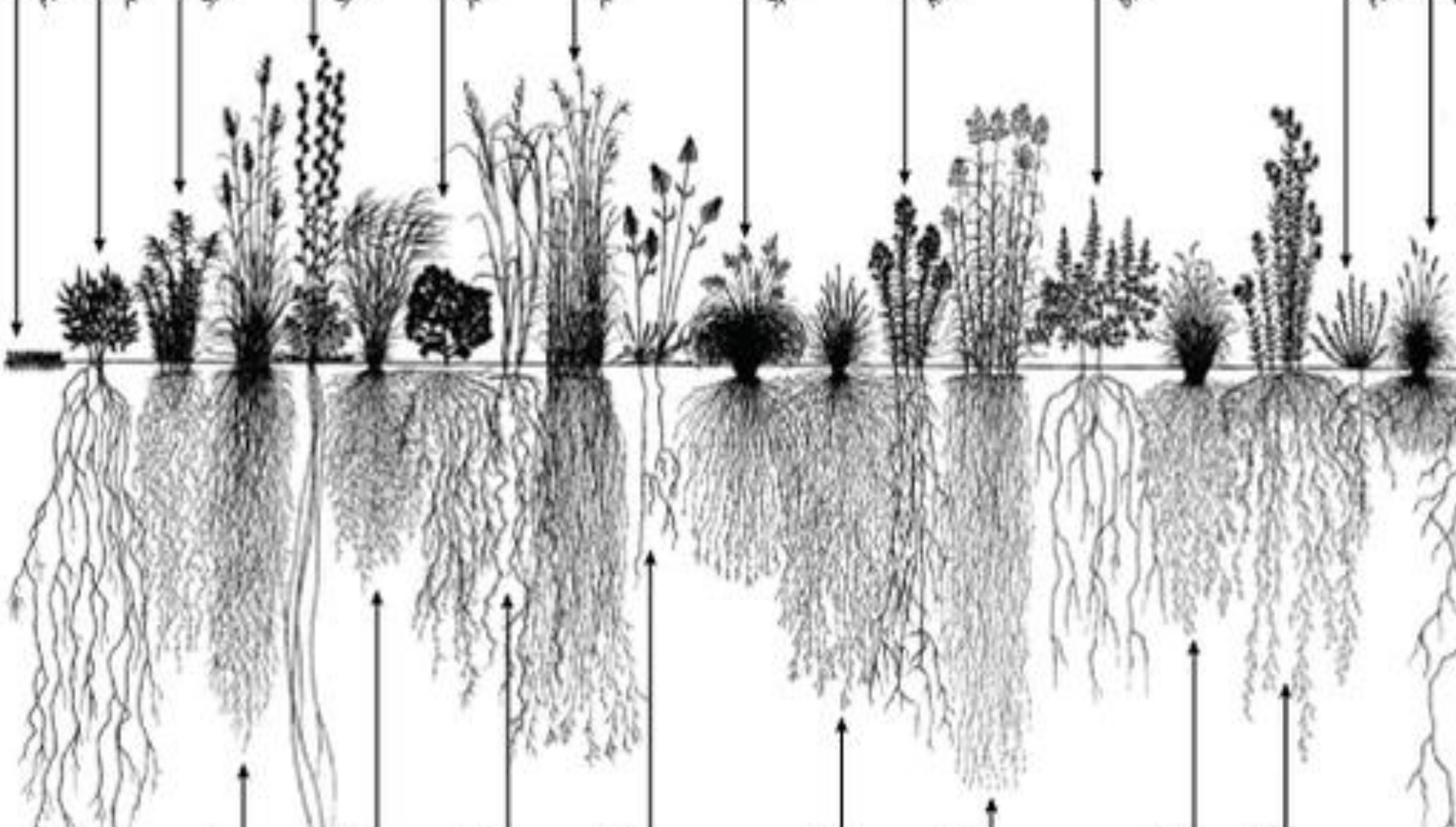

6) Increasing Survival

- Good fall growth. Plant early!
- High C/N structures.
- Multiple species can protect the ones you want to overwinter.
- Plants protect my soil, how do I protect my plants?


Protection from the Wind

Snow Protecting
my Plants,
Plants Protecting
my Soil,
Soil Protecting,
my
Soil Life!

6) Increasing Survival

- Good fall growth. Plant early!
- High C/N structures.
- Multiple species can protect the one you want to overwinter.
- Plants protect my soil, how do I protect my plants?
- Can I get more benefits from it next year?

*Red Clover Interseeded into V5 corn Summer of 2018.

*Grazed in April of 2019 when I ran out of feed.

6) Increasing Survival

- Good fall growth. Plant early!
- High C/N structures.
- Multiple species can protect the one you want to overwinter.
- Plants protect my soil, how do I protect my plants?
- Can I get more benefits from it next year?
- In the spring, be PATIENT!

Setup a greenhouse?

7) Grazing/Forage

- Lean on the grazing side.
- Balance your species for adequate Nutrition

8) Equipment

- Don’t need to break the Bank on the first year.

First time Interseeding


Gandy
Orbit-Air

8) Equipment

- Don’t need to break the Bank on the first year.
- Interseeding requires crucial timing so make sure you can get it done in 1-4days.


INTERNATIONAL CASE

8) Equipment

- Don’t need to break the Bank on the first year.
- Interseeding requires crucial timing so make sure you can get it done in 1-4days.
- Lots of ways to seed:
  - Plane/Drones
  - High Clearance/Spreaders
  - Drills
  - Rotary hoes
  - Interseeding Applicators(Dawn Duo seeders)

- Drills are great but pretty slow!


Gandy
Opti-Air


7250

9) Planting/Timing

- Plenty of moisture you can spread on top
- Drier conditions drill it: Dawn Dou seeders, dry fertilizer disk, regular drill with units removed over the row, Light incorporation: rotary hoe/Lillistin wheels
- The better your overall Soil Health becomes the more insects there are to eat seeds.
- Need to balance weather, chemical and crop growth!
  - Plans change!

10) MOISTURE!

- I tend to not seed if in a drought situation.
- Germination time is limited.
- Multi species tend to help each other in dry conditions.
- Shading the ground helps control weeds and save moisture.


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Endless benefits
for All!


“Everybody has
a Story to Tell”
In Memory of
Michael Cotter
1931-2017