Client Meeting

To Infinity and ...

Beyond Agronomy

Projects On The Go

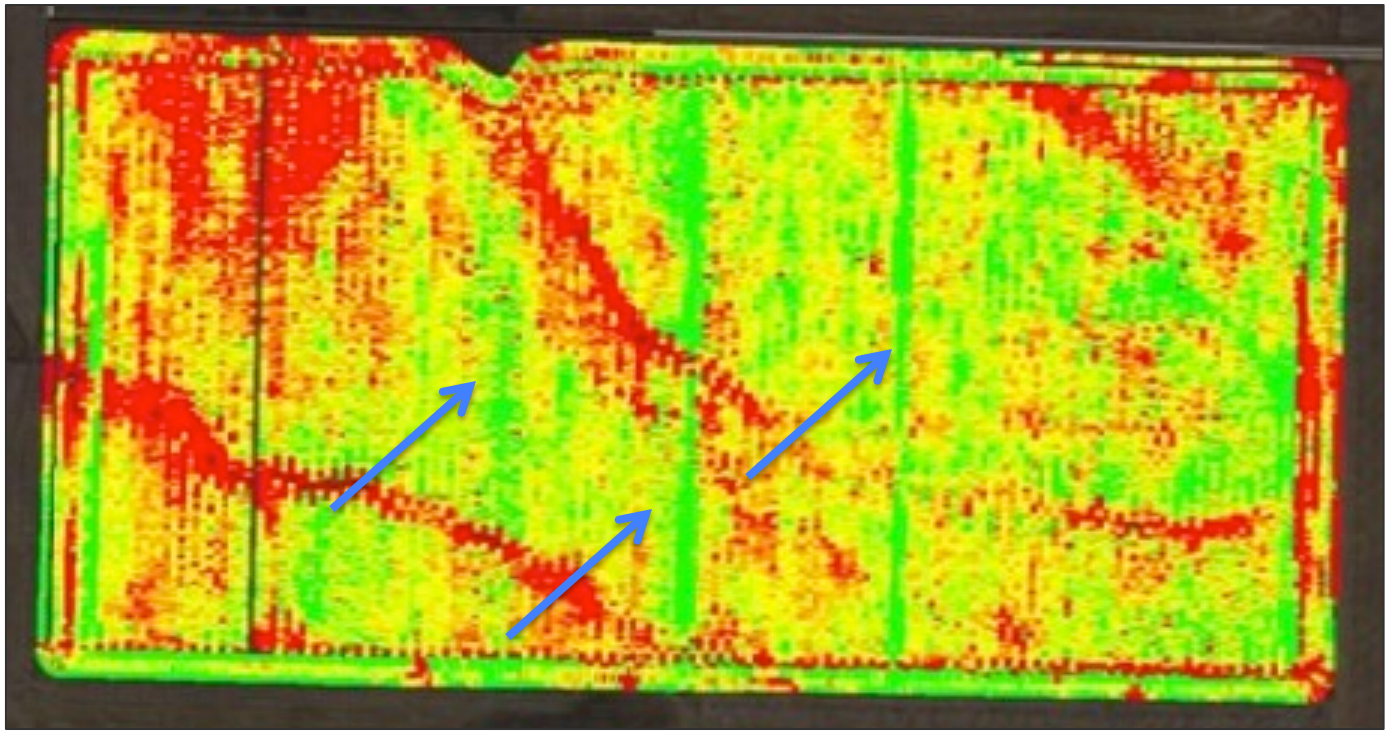
- Fence row farming
- Seeding and fertilizer use efficiency
- Plant growth regulators
- Is no-till going backwards?
- Cover crops

What is Fence Row Farming?

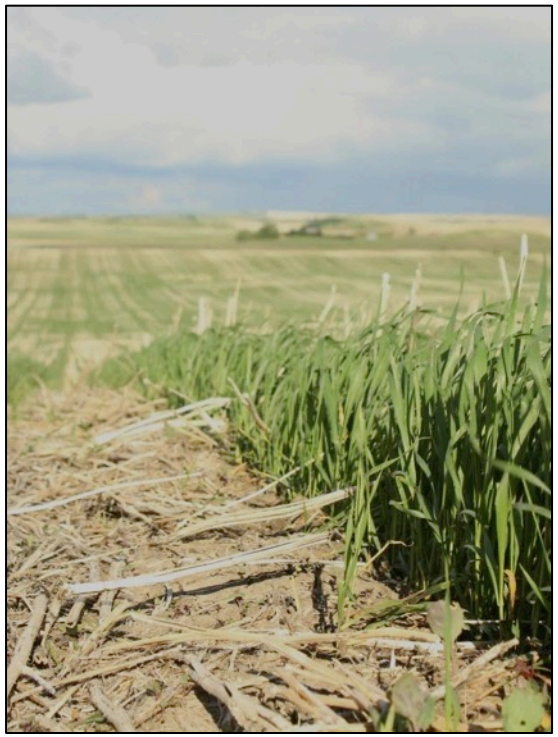
Dean Glenney uses a technique he coined Fence Row Farming. An approach to farming that has given him corn yields of around 300 bushels an acre, which is about double the county's average.

Fence Row Farming technique allowed the roots to go deeper into the soil. More nutrients were released and the water was used more efficiently, allowing the crops to thrive under drought-like conditions.

Fence Row Farming



Fence Row Farming



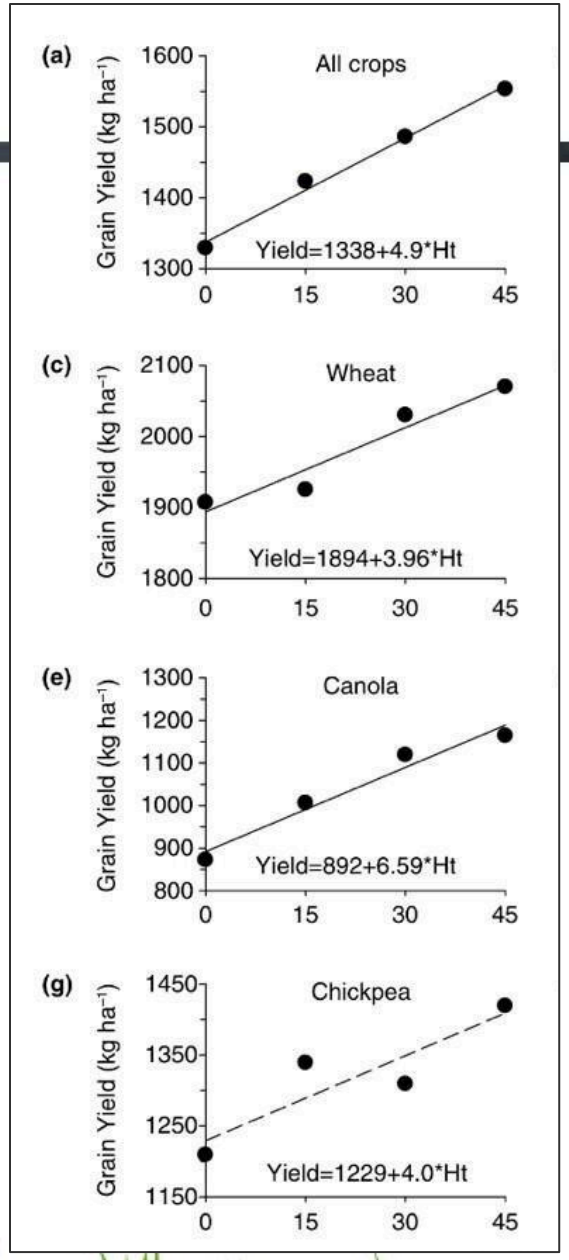
Fence Row Farming

Fence Row Farming

Up to 32 % yield increase with optimized spatial patterns of canola plant establishment in western Canada

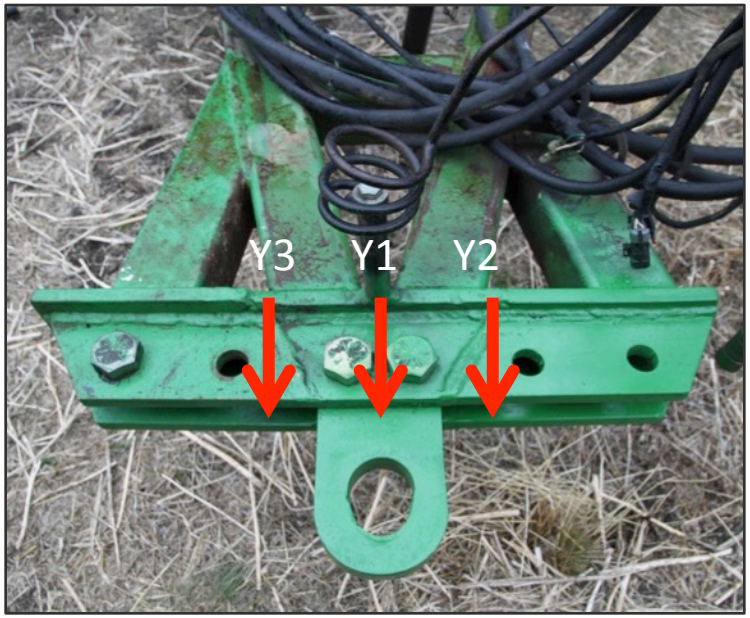
Fence Row Farming

Tall Stubble vs Yield



Source: Cutforth & McConkey et al 1997

Fence Row Farming



Straight Furrows

- John Deere iSteer Implement Guidance
- Trimble True Tracker
- ProTrakker MBW Side-hill Sensor

Seeding and Fertilizer Use Efficiency

Seeding and Fertilizer Use Efficiency

Table 2. Approximate crop yield decline for each day seeding date is delayed after May 1

Crop	Yield decline/day
Barley - malt	1.20%
Barley - grain	1.3
Barley - silage	1
Triticale - grain	0.8
Triticale - silage	1.1
Wheat – hard red spring	0.8
Wheat - soft white spring	0.9
Wheat - CPS	1
Wheat - durum	1.3
Canola	1.7
Flax	0.6

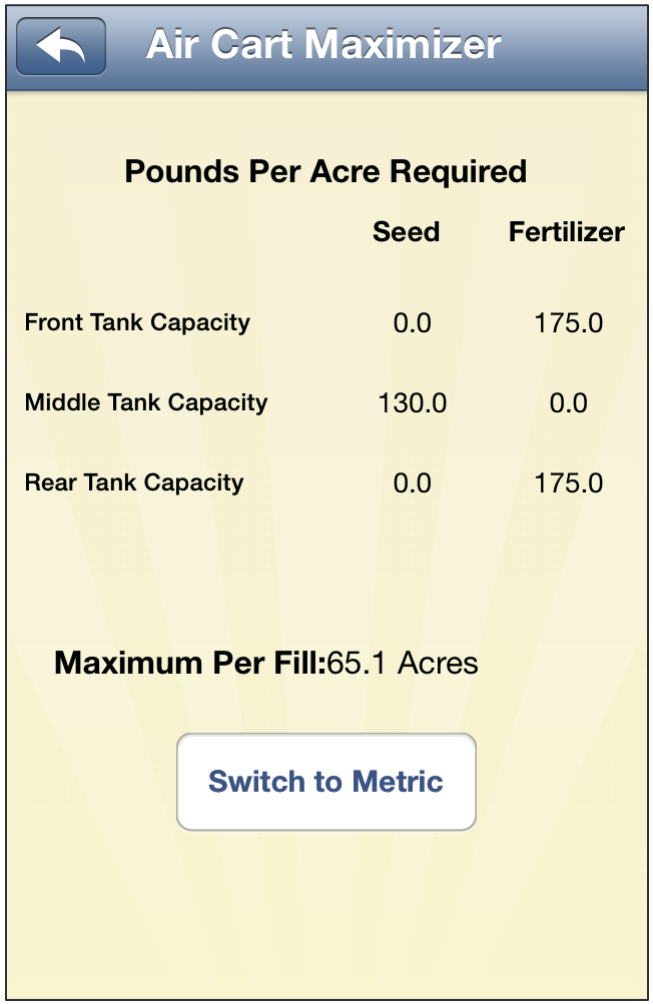
Source: Ross Mackenzie, Alberta Ag

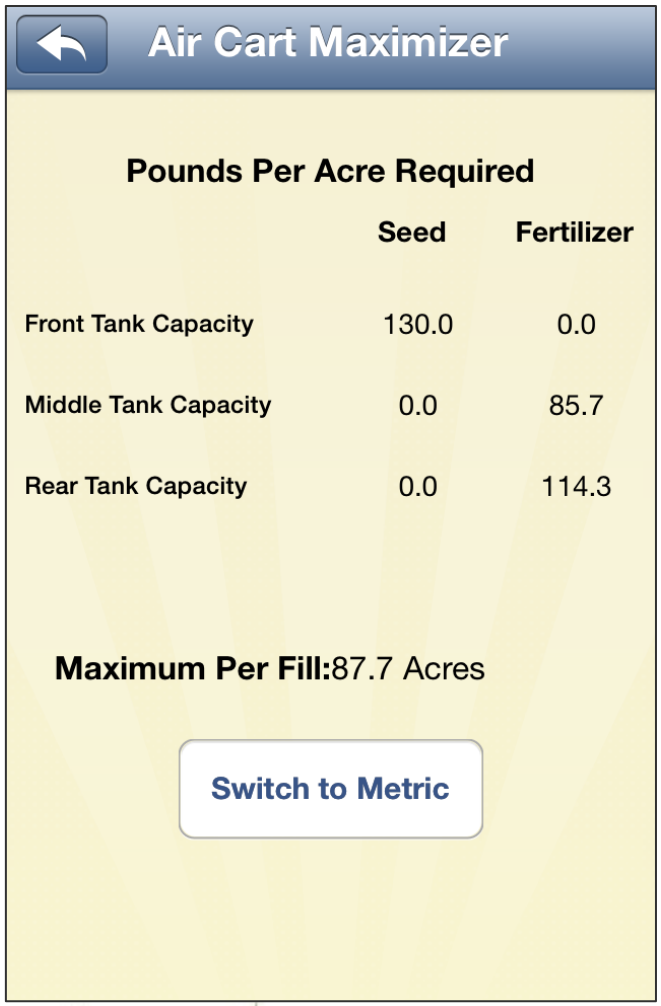
Steve's Quick Math: $/ac/Day

- Wheat: 0.8%/day x 65 bu/ac x $6.00 = $3.12
- Canola: 1.7%/day x 50 bu/ac x $9.50 = $8.07
- Barley: 1.3%/day x 100 bu/ac x $5.25 = $6.82

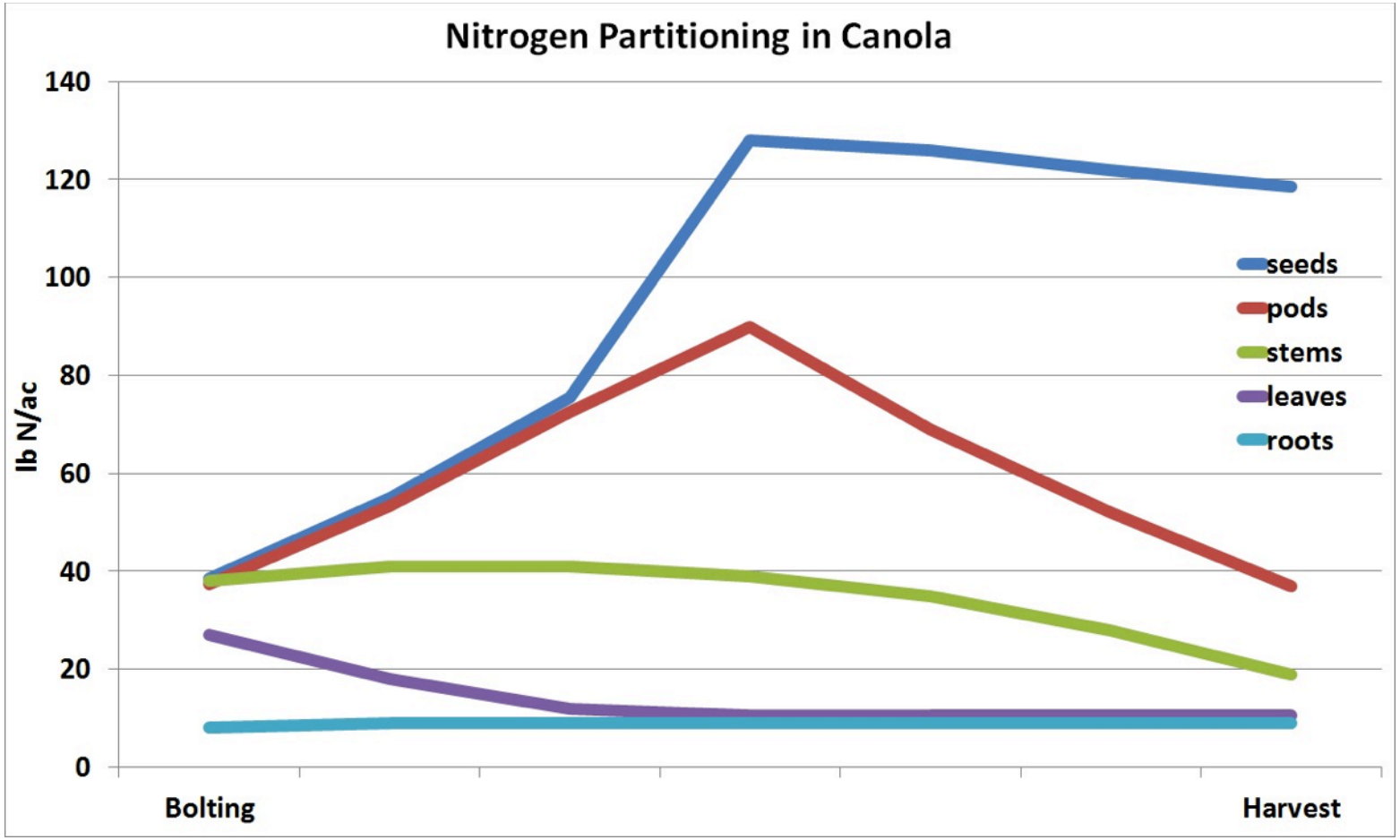
- We lose $6.00/ac per day for every day we seed past May 10th.
- May 25th end date seeding 200 ac/day on 5,000 ac farm = -$126,000.00 or -$25.20 ac

Seeding Efficiency



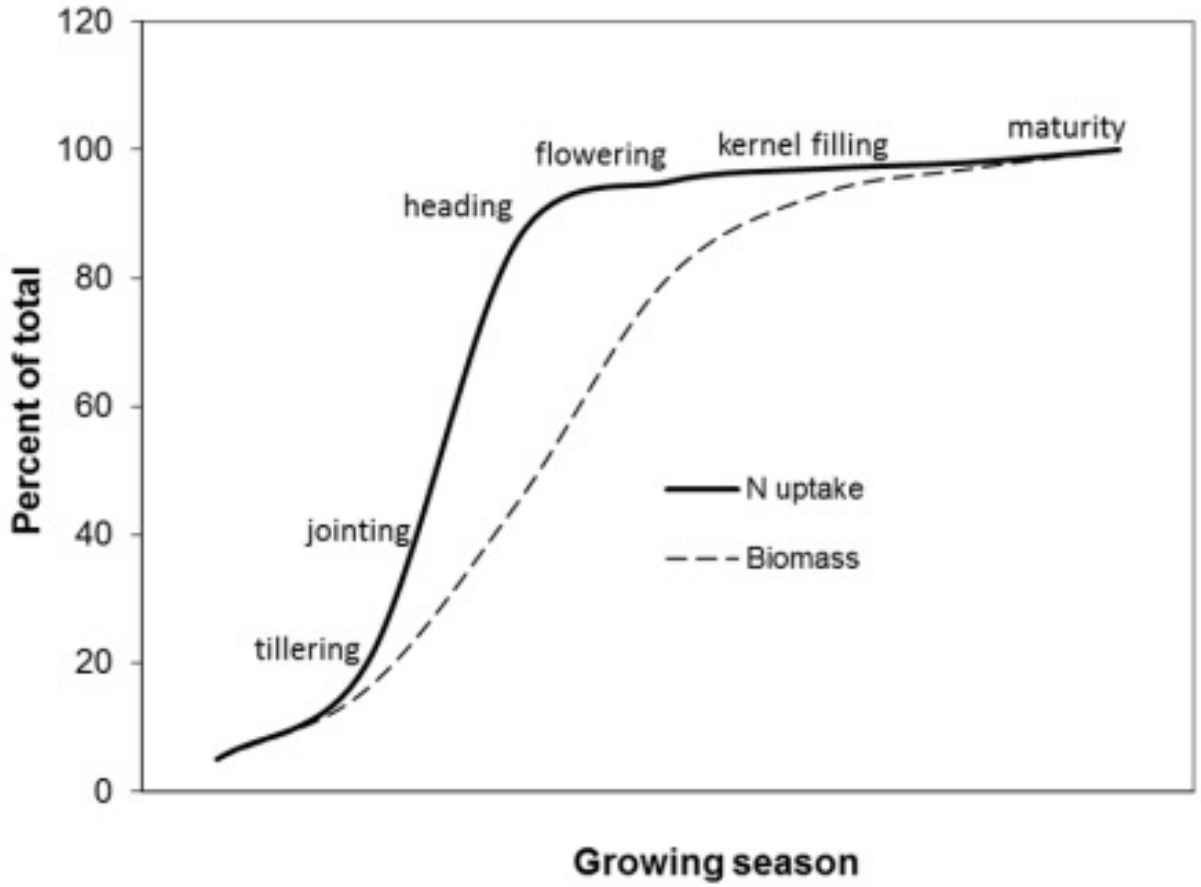


Split App Nitrogen: Canola



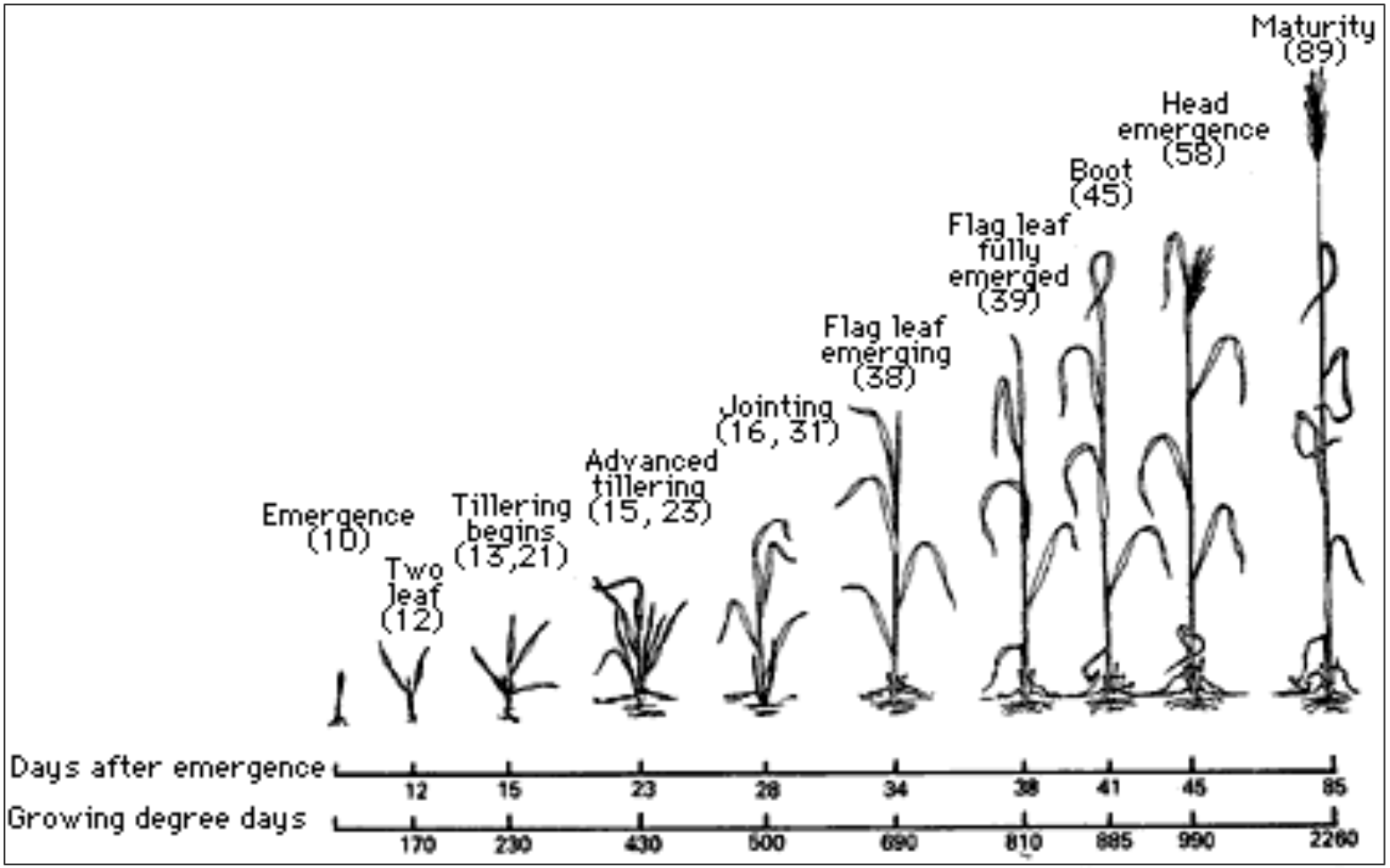
Source: Canola Council Canada

Split App Nitrogen: Wheat



Source: Steve Wright and Mike Ottman

Split App Nitrogen: Barley



Source: Steve Wright and Mike Ottman

Split App Nitrogen

Side dress Nitrogen: Canola

60 N seeding 120 N side dressed

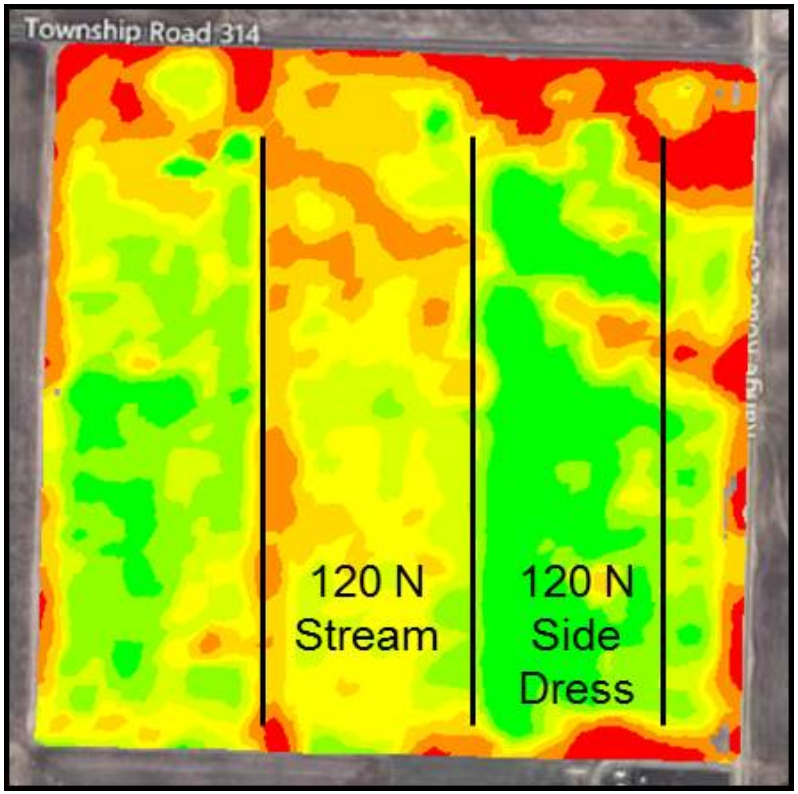
Yield: 65 bu/ac

60 N seeding 120 N streamed

Yield: 57 bu/ac

Yield increase:

14% or $75.00/ac



Side Dress Nitrogen: Wheat

Trial 1
15N split 60N side = 86 bu/ac

Trial 2
90N = 101 bu/ac

Trial 3
90N split 60N = 124 bu/ac

Trial 4
100N split 60N = 10.5 vs 12.3% pro

Foliar Phosphorus

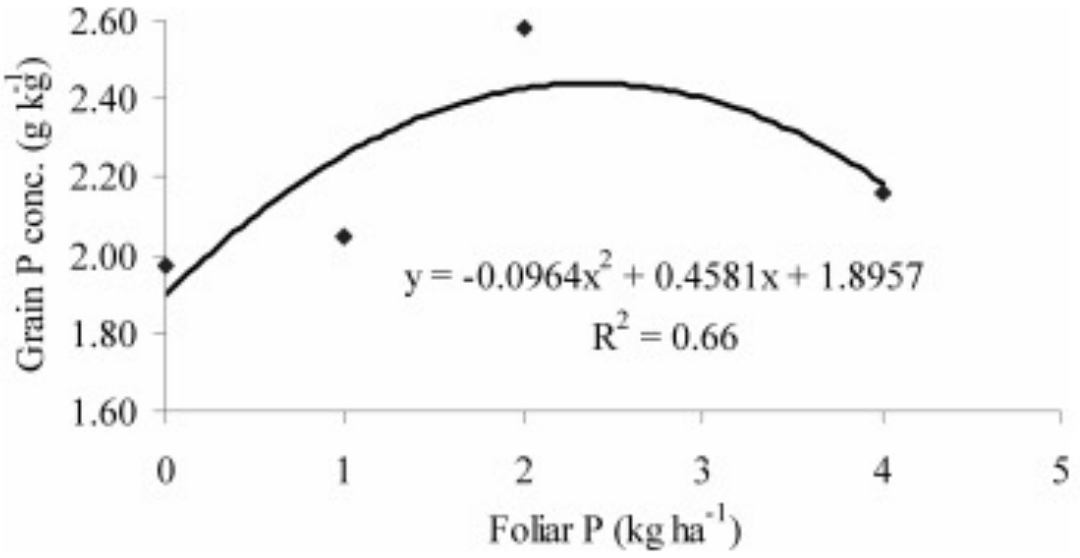


Figure 6. Relationship between grain P concentration (g kg^{-1}) and foliar P rates applied at Feekes 7 with pre-plant P rate of 30 kg ha^{-1} at Perkins, 2002.

Foliar Phosphorus

Yields obtained from foliar rates applied at vegetative wheat stages surpassed that of the foliar rate applied at reproductive stages (Chambers and Devos, 2001; Stanley, Hula, and Philips, 2003). Haloi (1980)

Delayed P applications resulted in a "stay green" effect whereby photosynthesis continued to take place during grain fill and that without the foliar P, more rapid senescence would be present.

PLANT ANALYSIS REPORT

To: BEYOND AGRONOMY
236 5TH AVE S
P.O BOX 1696
THREE HILLS, AB T0M 2A0
Attn: STEVE LAROCQUE

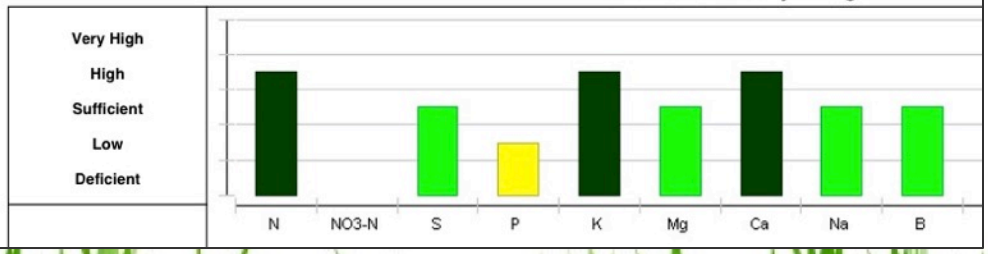
For:

Field: WHEAT 1T

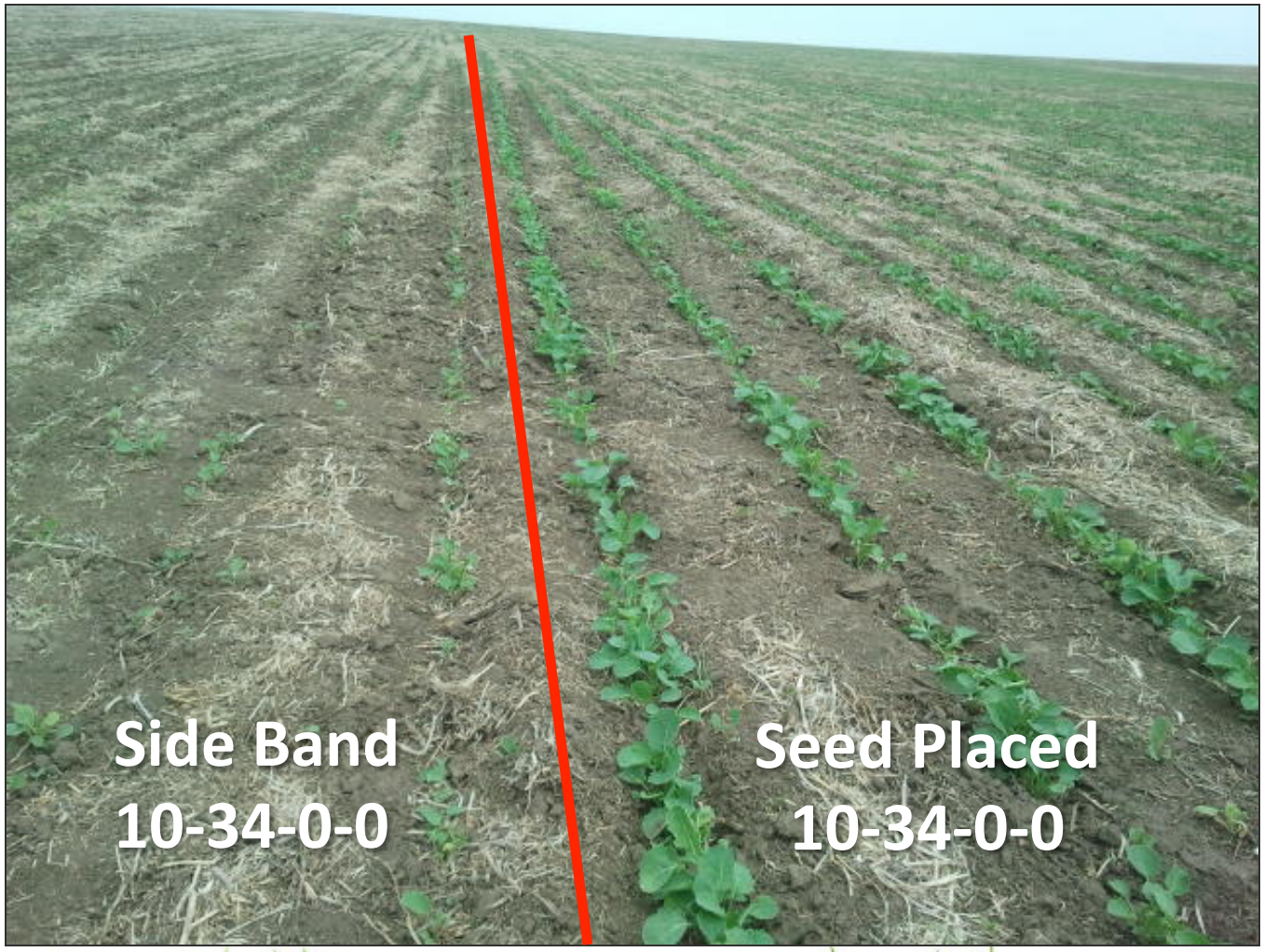
Date Sampled	Lab Number	Nitrogen (%)	Nitrate Nitrogen (%)	Sulfur (%)	Phosphorus (%)	Potassium (%)	Magnesium (%)	Calcium (%)	Sodium (%)	Boron (ppm)
2014-06-16	1690193	5.28		0.47	0.29	4.69	0.20	0.67	0.02	6
Normal Range		3.99 5.00		0.21 0.55	0.39 0.70	3.19 4.00	0.14 0.50	0.19 0.50	 0.03	5 25

	N/S	N/K	P/S	P/Zn	K/Mg	K/Mn	Fe/Mn	Ca/B	
Actual Ratio	11.2	1.1	0.6	116	23.9	1108	2.0	1196	
Expected Ratio	11.7	1.3	1.4	157	11.1	306	0.5	226	

Nutrient Sufficiency Ratings



Frost tolerance



Source: Cavalier Agro, Medstead, SK

Liquid Kit

Seeding and Fertilizer Use Efficiency

- Increase seeding efficiency by remove volume
  - Ex: 150 lbs blend
  - Add 20 ac/fill
- Match N+P with critical growth stages
  - Side dress nitrogen: 4 R's
  - Foliar top up of phosphorus

Plant Growth Regulators: Manipulator

Plant Growth Regulators: Manipulator

CWRS

35 trials

Height Reduction	Occurrence
5% +	95%
10% +	83%
15%+	53%
20%+	20%

Yield Increase	Occurrence
5% +	85%
7.5%+	63%
10%+	55%

CPS

12 trials

Height Reduction	Occurrence
5% +	100%
10% +	67%
15%+	33%
20%+	8%

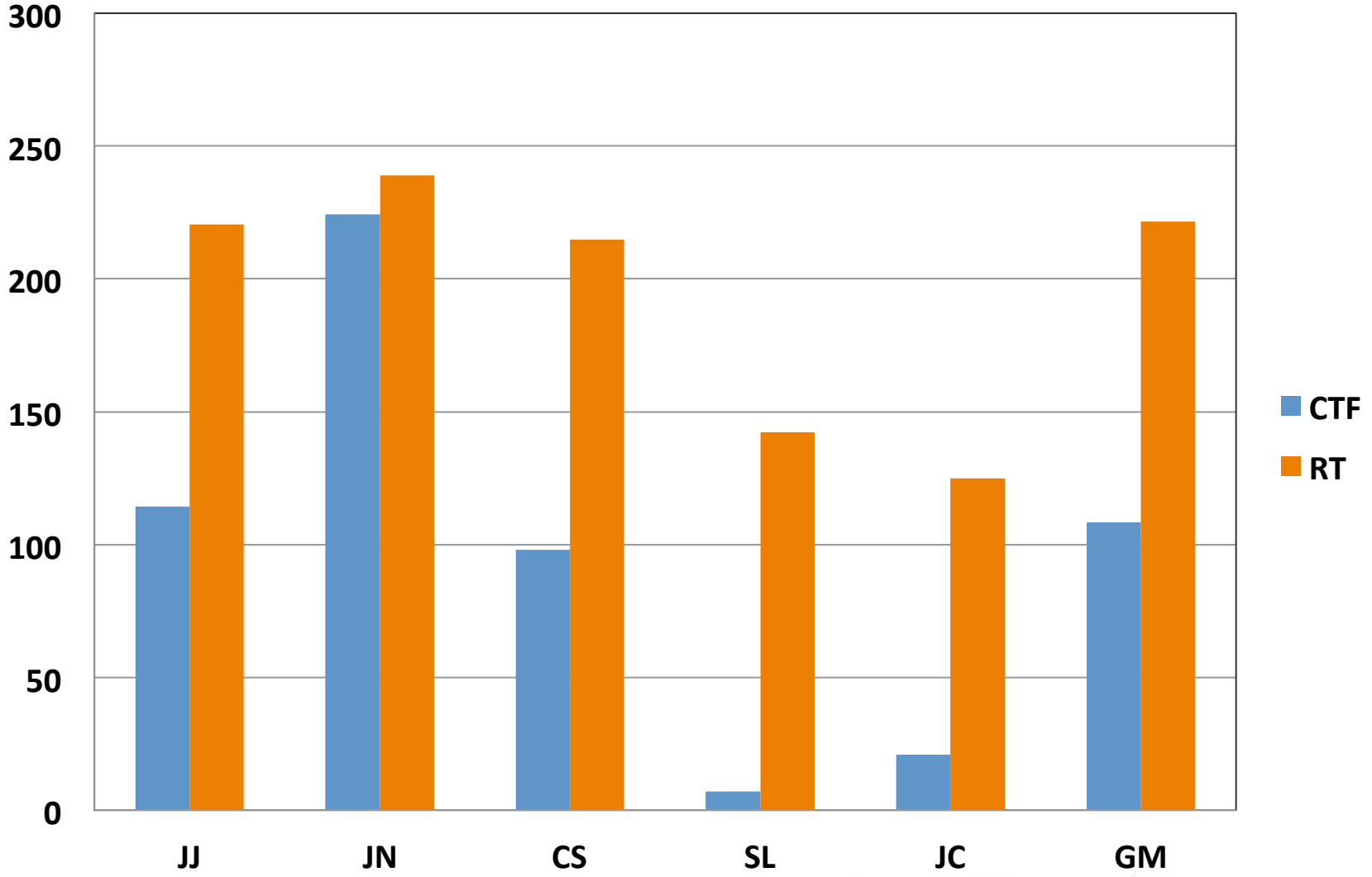
Yield Increase	Occurrence
5% +	33%
7.5%+	25%
10%+	8%

Is No-till Going Backwards?

CTF vs Random Traffic

Castor Wheels

Time to Infiltrate 1" of Water (seconds)



Zero-Till & Low Diversity

Long-term rotation and tillage effects on soil structure and crop yield

Lars J. Munkholm [a,b,*], Richard J. Heck [b], Bill Deen [c]

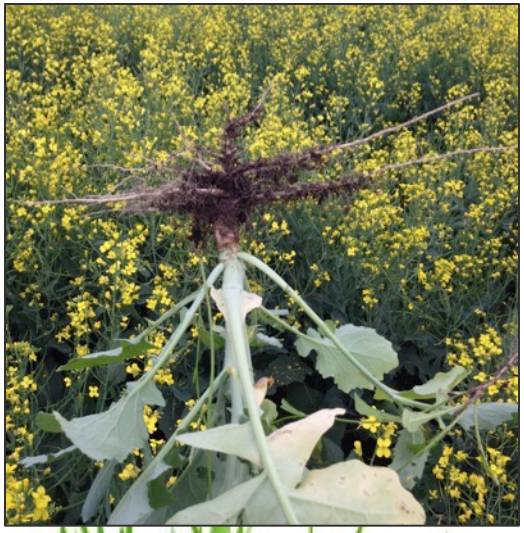
- The visual soil structure evaluation supported the hypothesized positive effect of diverse rotation (including cover crop) on soil quality – especially under no tillage. For no tillage, optimal soil structure was only found in diverse R6 rotation that included a cover crop.
- The quantitative physical properties confirmed the positive effect of intensive tillage on soil structure but showed in general a weak and insignificant effect of rotation.
- Crop yield correlated significantly with the visual soil structure scores.

Soil Structure

Poor soil structure was found for NT except when combined with a diverse crop rotation (R6).

Structure affects crop yield through a complex of root-based mechanisms including those that are moisture related.

We conclude that a diverse crop rotation was needed for an optimal performance of NT for the studied soil.



Solutions

- Fence row farming: Recreating headlands
- Match rubber and psi to axle loads
- Moldboard plow
- Deep ripping
- Cover crops

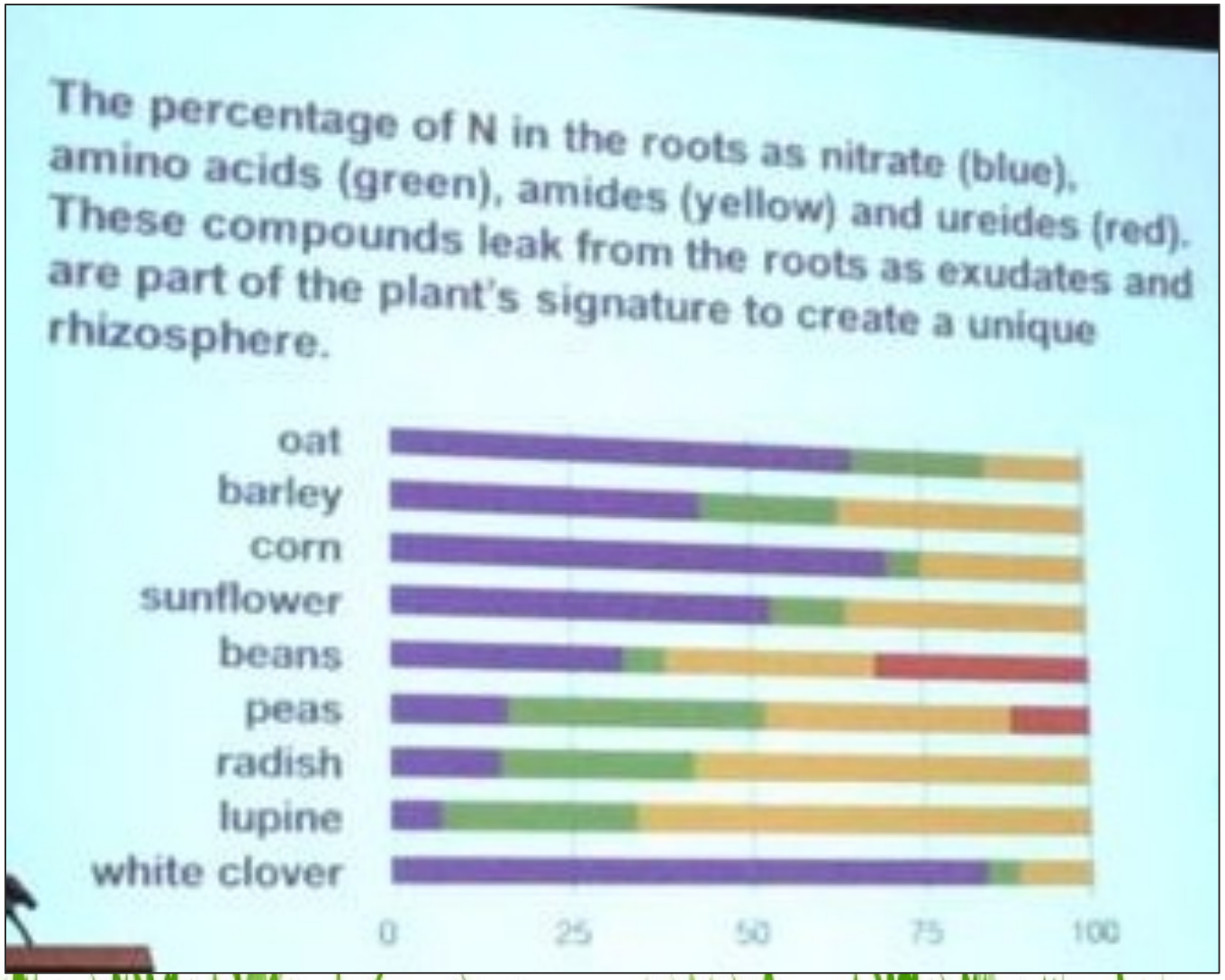
Cover Crops: Why?

- Reduce soil compaction
- Increase nutrient availability
- Increase soil carbon (OM)
- Hold nutrients
- Reduce insect and weed pressure
- Break disease cycles
- Revenue stream

Cover Crops Options

- Hairy Vetch
- Common Vetch
- Field Peas
- Crimson Clover
- Berseem Clover
- Chicory
- Italian Ryegrass
- Oats
- Dutch Clover
- Sorghum
- Radish
- Winter Brassica
- Forage Rape
- Cow Peas
- Mung Beans
- Ethiopian Cabbage

Cover Crops


The percentage of N in the roots as nitrate (blue), amino acids (green), amides (yellow) and ureides (red). These compounds leak from the roots as exudates and are part of the plant's signature to create a unique rhizosphere.
oat
barley
corn
sunflower
beans
peas
radish
lupine
white clover
0
25
50
75
100

Cover Crop Applications

Beyond Agronomy

- Creating fence rows every year
- Increasing seeding efficiency: 1% loss per day
- Match N+P with critical growth stage
- Manipulator shows promise
- No-till needs a facelift
- Cover crops add diversity without moving away from profitable crop rotations.