COVER CROP IN EASTERN CANADA, QUEBEC
For cover crops convention in London
February 28th, 2013

Presented by :
Raymond Durivage
Daniel Briere agr.

ferme EDPA inc. durivage
depuis 1870

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November 18th, 2010 Saint-Pie

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Fall 2012

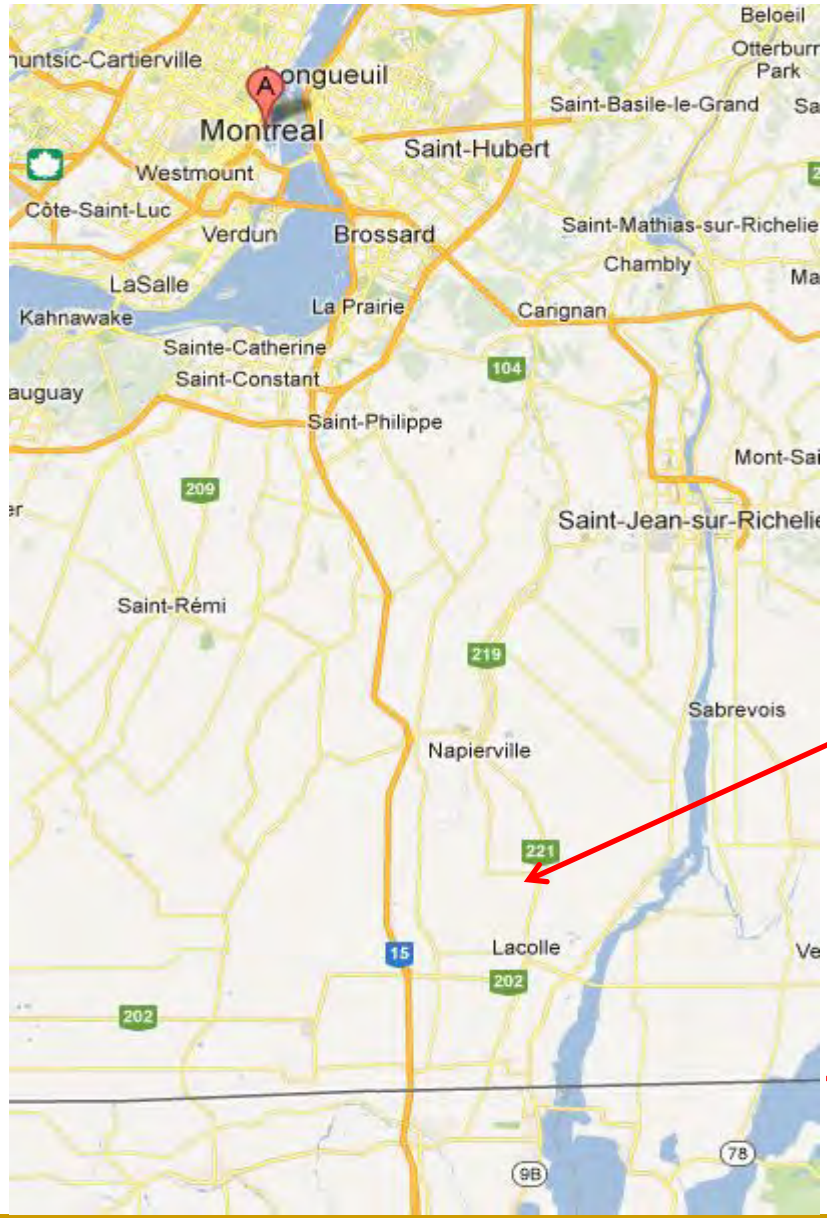
Do not farm naked!

Harvest on golf green!


JOHN DEERE


APV


APV



Raymond Durivage

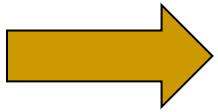
13 miles

New York state

Raymond Durivage

- EDPA Farm
  - Family farm : 5th, generation of farming
  - Located south of Montreal (13 miles north of New-York State)
- In 2010, rewarded as best soil conservation practices by Quebec's agriculture department

- 20 years of minimum tillage with special attention to crop rotation and cover crop



Uniform yield even in challenging year (drought wet or cold season)

- In 2005, track were implemented especially at harvest to reduce soil compaction.

- RTK technology is used to increase efficiency, precision and reduce soil compaction.

Crop and animal production

- Corn: 890 acres
- Soybeans: 740 acres
- Wheat: 740 acres
- Hay: 50 acres
- Research : 12 acres
- Swine production: 7200 pigs
- Genetic bull station

- **Soil description**

  Sandy loam,

  Shallow A : 12 inches

- **TYPICAL YIELDS** bu/ac (3 years)

	REGION	FARM
CORN	125	175
SOYA	40	49
WHEAT	47	68

- Targeted benefits of cover crop in corn:
  - ↓ erosion and soil cover during the off season
  - ↓ lost N and K_2O
  - ↑ soil structure ➡ better drainage ➡ ↑ Yield
  - Improve environmental impact of corn crop
  - ↑ micro organisms activity during longer growing season


2009! The rye grass
come back

Fall 2011

SPRING 2012

SPRING 2012

Management practice in 2009

- Seeding at 4 – 8 leaves of corn
  - 2 methods were evaluated:
    - Broadcast seeding with Delimbe air force seeder
    - Seed mix with liquid pig manure spreader (light incorporation)


DANGER PROJECTION
DE GRANULES
Hatzenbichler
Hatzenbichler
BODENSCHONENDE LANDTECHNIK


89


Excellent stand

June 30th : manure ? Seeding.. Uneven density

Yield (bu/ac) in 2009

Field	machinerie used to seed	Cultivar used e= Ellite m = Mycoger	# of repetition	rye grass raiting stand 1= poor 3= ideal	Yeld (bu/ac)	moisture at harvest
102	mc [1]	e	3	1	183	32.6
102	md [2]	e	3	1	201	33.5
102	kc [3]	m	3	1	196	36.8
103	mc	m	2	1	172	38.4
					188	35.3
103	kc	m	2	1.5	191	37.5
103	md	m	2	2	183	37.6
102	kd *	m	2	3	193	37.5
103	kd	m	2	3	180	37.6
					186	37.5

mc [1] : Max and tanker
md [2] : Max and Delimbe
kc [3] : commun and tanker
kd * : commun and Delimde

Conclusion 2009

- Corn yield :
  - no significant difference with or without rye grass
- Method of seeding
  - Air force seeder was better than applied (incorporated) with liquid pig manure spreader
- Seeding rate was too low at 11 -12 lb/ac

Rye grass, Biomass : ???

2009 Season: a small plot of fall seeding Mid September !!???

Survival winter 2009-2010

Survival winter 2009-2010

No permanent snow cover

2010 Management practices

- Seeder used: Delimbe only
- Rate: 11 and 21 lb/ac
- Rotation: wheat ➡ Corn with rye grass

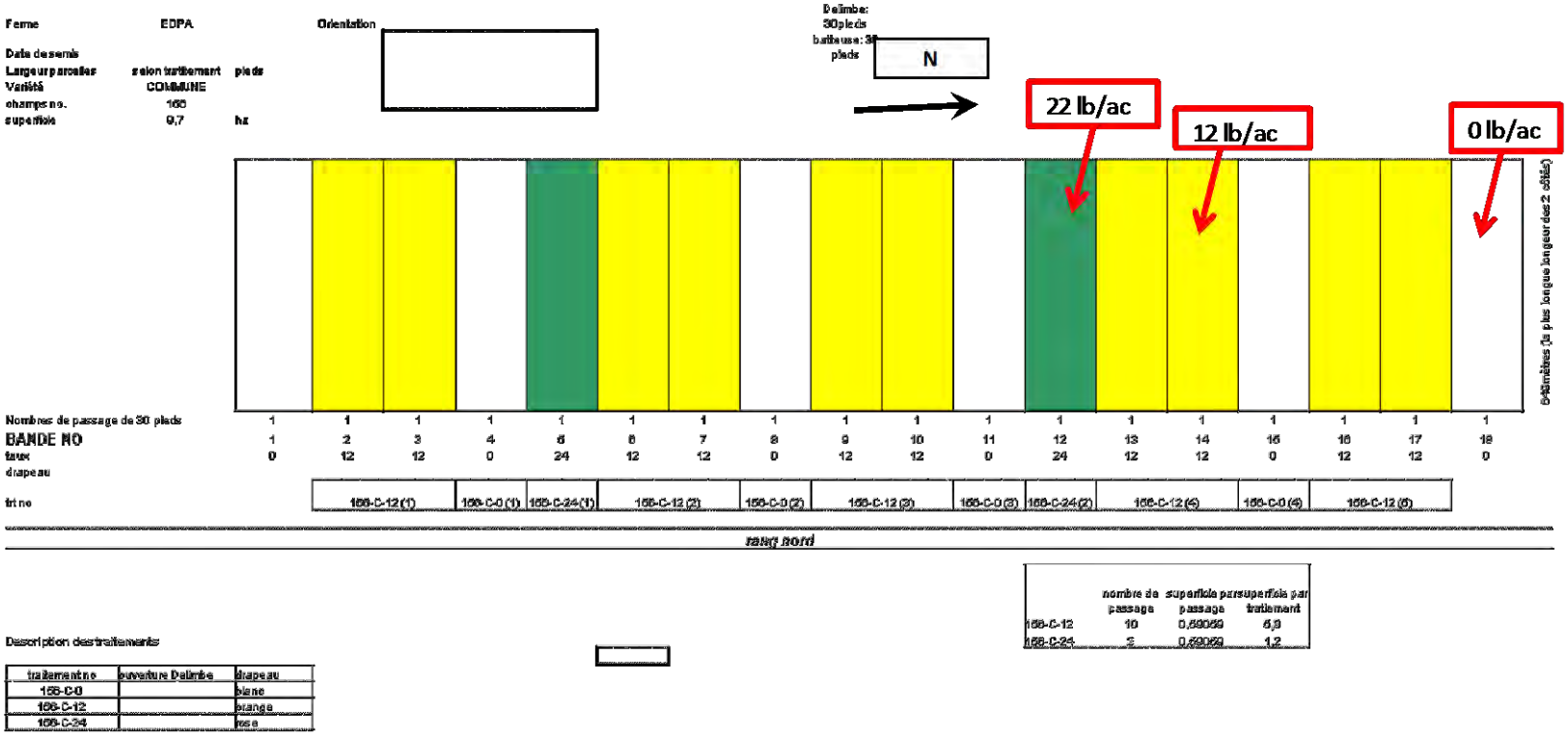
Parameters of 2010 trails

- Corn seeded May 12th
  - Pi 38N88 (88 days corn)
  - Pi 38N85 (88 days corn)
- Glyphosate vs Integrity (diméthenamide-P 600g/l saflufenacil 68g/l)
  (Frontier® and Eragon®)
  - Rye grass (seeded June 15th)
  - Delimbe seeder
- Manure broadcast after rye grass seeding

Treatments

- 3 Treatments :
  - 1 - no rye grass
  - 2 - 11 lb/ac rye grass
  - 3 - 22 lb/ac rye grass

Trials display



	nombre de passage	superficie par passage	superficie par traitement
166-C-12	10	0,59059	5,9
166-C-24	2	0,59059	1,2

Description des traitements

traitement no	ouverture Delimbe	drapeau
166-C-0		blanc
166-C-12		orange
166-C-24		rose

Biomass at harvest

- Superior results with manure at 22 lb/ac
- Intermediate results with 11 lb/ac with manure
- Poor result at 11 or 22 lb/ac without manure

- Only mineral fertilizer

- At 22 lb/ac superior results than at 11 lb/ac
- At 11 lb/ac 50/50 results

Yield (bu/ac) in 2010

Field	seeding rate	# of repetition	rye grass raiting*	Yield (bu/ac)	moisture at harves
154	0 lb	3	0	181	17.6
	11 lb	4	1.75	173	17.4
	22 lb	3	2	167	17.1
156	0 lb	3	0	194	18,7
	11 lb	5	1.3	191	18.8
	22 lb	2	2	196	18.9

* 0 to 3 (3 = ideal stand rye grass)

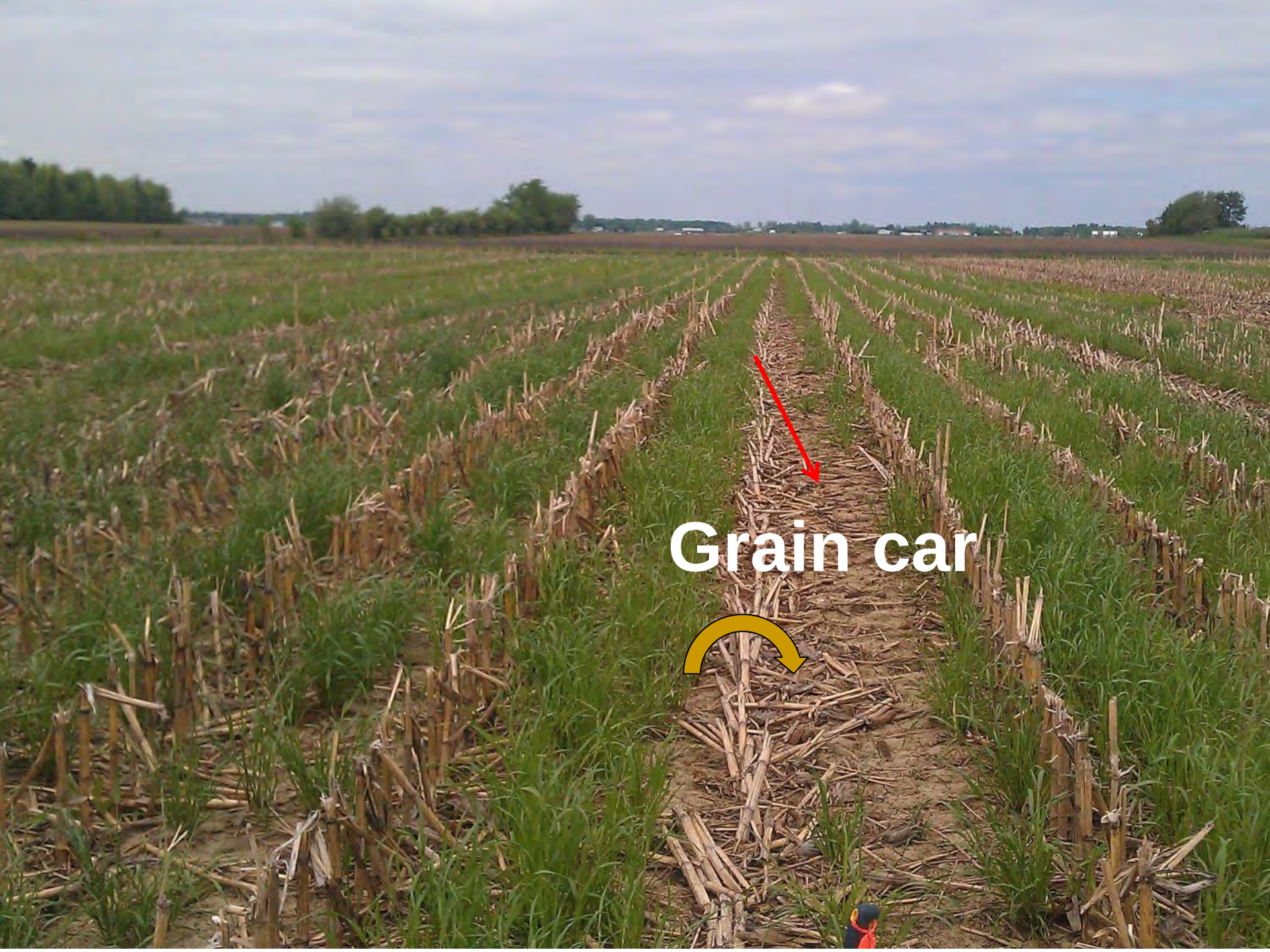
Conclusion 2010

- Superior biomass results than 2009 (22 lb/ac)
- Yield:
  - No significant yield difference with rye grass being seeded at early stage of corn…
- Seeder used:
  - Gave more uniform stands than 2009

→ **Kverneland and Delimbe**

2011 Trials of rye grass

- Repeated rye grass as a cover crop in corn
- Yield performance comparison in soybean when rye grass was used as a cover crop in corn the previous year (2010)


Grain car

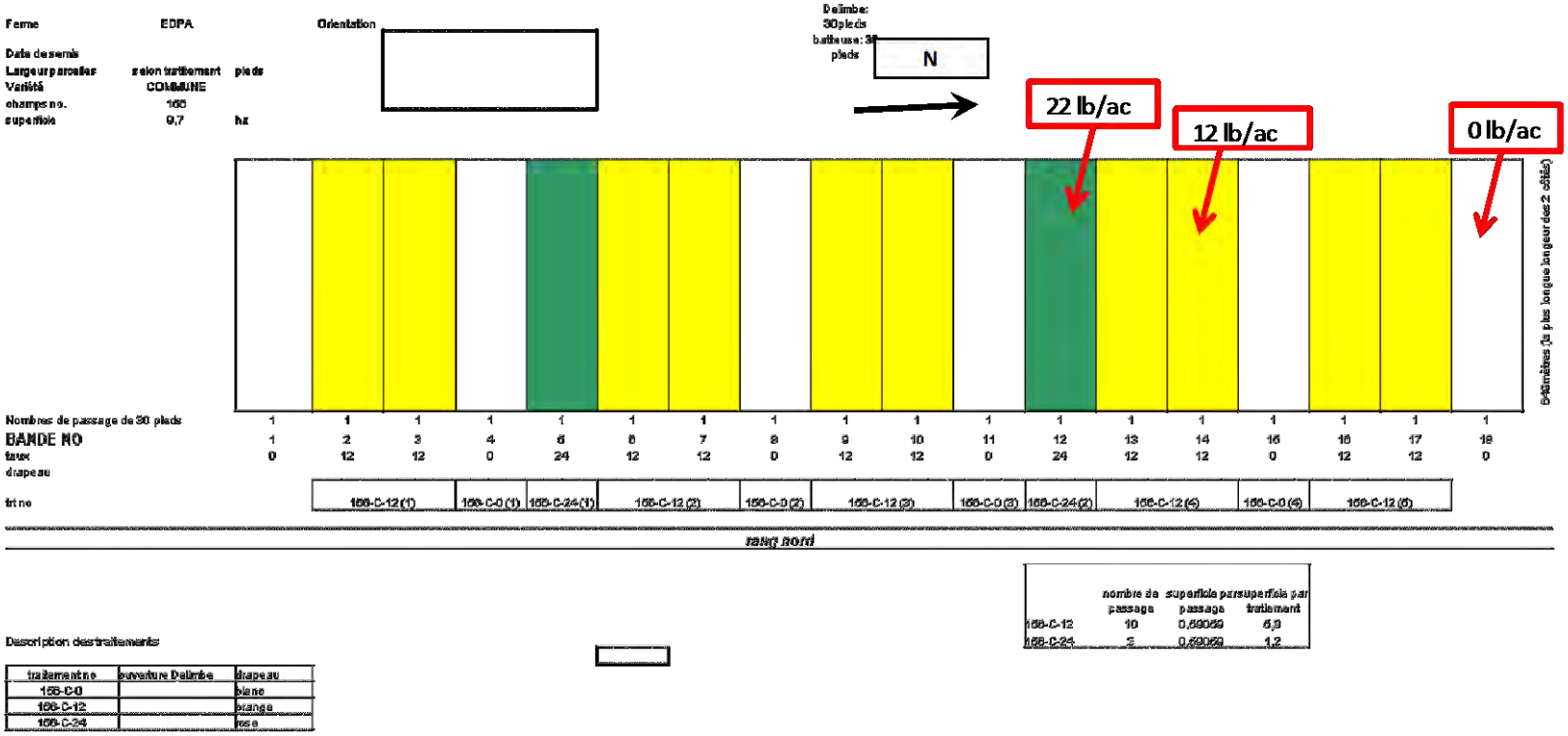
Yield comparison of soybean in 2011 when seeded where rye grass was used as cover crop in corn in 2010

- Management trials practices 2010
  - Seeding rate rye grass : 22 lb/ac
  - Soil cultivation with Lemken (2'')
  - Herbicide used Prowl® and Conquest®
  - Seeding
    - 15 inches row
    - Cultivar: non GMO
    - Seeding date: May 27th
    - Fertile soil

Soybean 2011

- Observation
  - Emerging of the seed was tough as one inch of cold rain in 48 hours follow by 13 days without rain

Trials display



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166-C-0		blanc
166-C-12		orange
166-C-24		rose

Soybean with rye grass : + 4 bu/ac

Fields # 156						
		rep 1	rep 2	**mean**	**Standard deviation**	**coefficient of variability**
yeild bu/ac	rye grass	55	58	**56.5**	**0.12**	**3%**
	check	52	53	**52.5**	**0.07**	**2%**
		rep 1	rep 2	**mean**	**Standard deviation**	**coefficient of variability**
plant/ac 000/ac	rye grass	112	145	**128**	**23.33**	**18%**
	check	126	142	**134**	**11.74**	**9%**
		rep 1	rep 2	**mean**	**Standard deviation**	**coefficient of variability**
Moisture %	rye grass	11	10.6	**10.8**	**0.28**	**3%**
	check	11	10.6	**10.8**	**0.28**	**3%**

Season 2011

Cover crop in corn 2011

- New :
  - Rate : 22 lb/ac
  - Herbicide :
    - Integrity (diméthenamide-P 600g/l saflufenacil 68g/l)
      (Frontier® and Eragon®)
    - Roundup (glyphosate)

Management practice in 2011

- Seeding date corn : may 13th
- Seeding of rye grass : June 8th
  - Rate : 22 – 23 lb/ac
- Manure spread after seeding of rye grass

Yield comparison with and without ryegrass in corn (2-6 leaves) in 2011

DEKALB 43-30 (93 days corn)						
	trt	rep 1	rep 2	**mean**	**Standard deviation**	**coefficient of variability**
yeild Bus/ac	rye grass	204	NA	**204**	**NA**	**NA**
	Check	194	204	**199**	**0.4**	**3%**

		rep 1	rep 2	**mean**	**Standard deviation**	**coefficient of variability**
plant/ac 000/ac	rye grass	33	34	**33.5**	**0.71**	**2%**
	Check	33	36	**34.5**	**2.12**	**6%**

		rep 1	rep 2	**mean**	**Standard deviation**	**coefficient of variability**
test weight %	rye grass	20.6	NA	**20.6**	**NA**	**NA**
	Check	20.9	20.9	**20.9**	**0**	**0%**

Biomass vs herbicide used in 2011

- 1- Roundup® (glyphosate)
- 2- Integrity® (diméthenamide-P 600g/l saflufenacil 68g/l) (Frontier® and Eragon®)

- Visual observation : no difference
  - Biomass results (fall):
    - 1- 1240 lb/ac Roundup (glyphosate)
    - 2- 1767 lb/ac Integrity (diméthenamide-P 600g/l saflufenacil 68g/l) (Frontier® and Eragon®)

Fertilizer value $ scavenge with rye grass - 2011

	Nitrogen				Potash				
Biomass T/ac	lb/ac	$/ac	coeff.	Fertilizer value (2012) $/ac	lb/ac	$/ac	coeff.	Fertilizer value (2012) $/ac	Total $/ha
1.84	25	12	0.5	6.11	31	12.50	0.9	11.33	17.44
1.76	36	17	0.5	8.50	42	18.00	0.9	15.75	24.29
								moy	21

+33% Roots contribution to biomass

Fertilizer value	21 $/ac
compaction	? $$
↑ Yield next year	? $$
	21 $/ac

$27/ acre (fall)

2012 Success and disappointment

- Surprise:

  Winter survival of rye grass seeded in soybean September 9 2011 (not of clover or tillage radish)

- Disappointment:

  Direct seeding in permanent cover crop did not happen

Fertilizer value $ scavenge with rye grass - 2012

	Corn seeded April 20	Ray grass seeded at 8 leaves stage	Raygrass seeded June 7		Corn reseeded May 25	Raygrass at 2 leaves stage	Raygrass seeded June 7	Total
	Field F				**Field H**			**Field F + H**
	0,78t/ac	0,78t/ac	0,78t/ac	0,78t/ac	0,28t/ac	0,28t/ac	0,28t/ac	
	%	Analyse	lb/ac	$/ac	%	lb/ac	$/ac	Mean/ac
N	%	2,82%	67 lb/ac	$40/ac	3,16%	26 lb/ac	$17/ac	$28,5/ac
P	%	0,47	8 lb/ac		0,43%	2,6 lb/ac		
K	%	3,75	88 lb/ac	$40/ac	3,28%	28 lb/ac	$11/ac	$25,50
			Total	**$80/ac**		**Total**	**$28/ac**	**$54/ ac**

Note : Biomass of roots was calculated assuming to be 33% of foliar

Fertilizer value	**54$/ac**
compaction	**? $$**
↑ **Yield next year**	**? $$**
	54 $/ac

$54/ acre (fall)

Rye grass 2011
Foliar analysis and fertilizer value

# labo		4580	4581
Plot		102, Roundup	103, Integrity
Delever date		18-01-2012	18-01-2012
dry matier	% or ppm		
N	%	2.07	1.98
P	%	0.36	0.31
K	%	2.49	2.42
Ca	%	0.51	0.42
Mg	%	0.15	0.12
Na	ppm	232	186
Zn	ppm	36	27
Cu	ppm	12	11
Mn	ppm	83	61
Fe	ppm	544	401
Bore	ppm	9	8
S	%	0.23	0.21
Al	ppm	333	262

Rye grass 2012
Foliar analysis and fertilizer value

# labo		6649	6650
Plot		Rgrass-F	Rgrass-H
Delever date		2012-12-18	2012-12-18
dry matier	% or ppm		
N	%	2,82	3,16
P	%	0,47	0,43
K	%	3,75	3,28
Ca	%	0,52	0,46
Mg	%	0,17	0,17
Na	ppm	858	985
Zn	ppm	58	68
Cu	ppm	18	16
Mn	ppm	44	48
Fe	ppm	277	524
Bore	ppm	3	3
S	%	0,29	0,26
Al	ppm	143	446


Season 2012 was excellent for rye grass


Season 2012: Roots at more than 2 feet

Season 2012

- Seeding of rye grass at earlier stage of corn (2-6 leaves) = No yield drag
- Seeder to used:
  - Delimbe broadcast
  - Exacta HL Kverneland (150 acres per day)

→ 4 bu/ac on soybean and 9 bu/ac where a light cultivation (Lemken) over rye grass stubs as compare where seeded over bare soil


Kverneland
Exacta-HL
Kverneland
Accord


2012 season


2012 season


Fall 2012

Conclusion

- In Quebec the enthusiasm and results with rye grass is as much a surprise as when the Leafs beat Montreal 6-0 . The difference with the Leaf is the rye grass will usually emerge in spring and as it will not be winter kill

Questions????