Cover Crops and Manure – A Good Match

MCCC Cover Crop Workshop - February 28, 2013

Ontario
Ministry of Agriculture and Food
Ministry of Rural Affairs

Cover Crops - Why?

- Erosion protection
- Nitrogen Scavenging
- Nutrient cycling
- Build organic matter
- Soil structure
- **Feed / pasture**
- Break pest cycles

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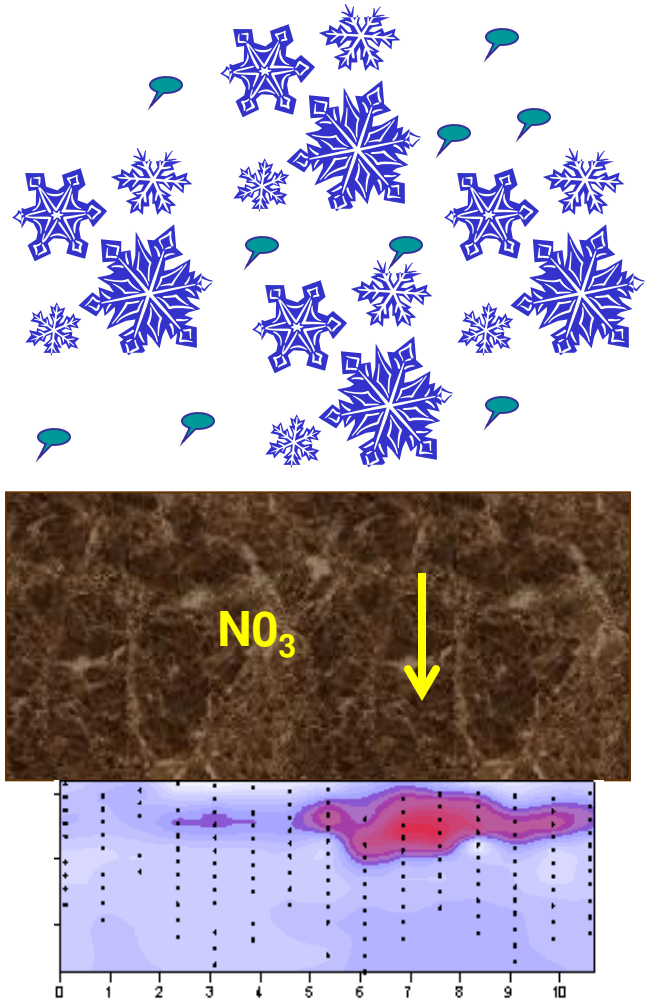
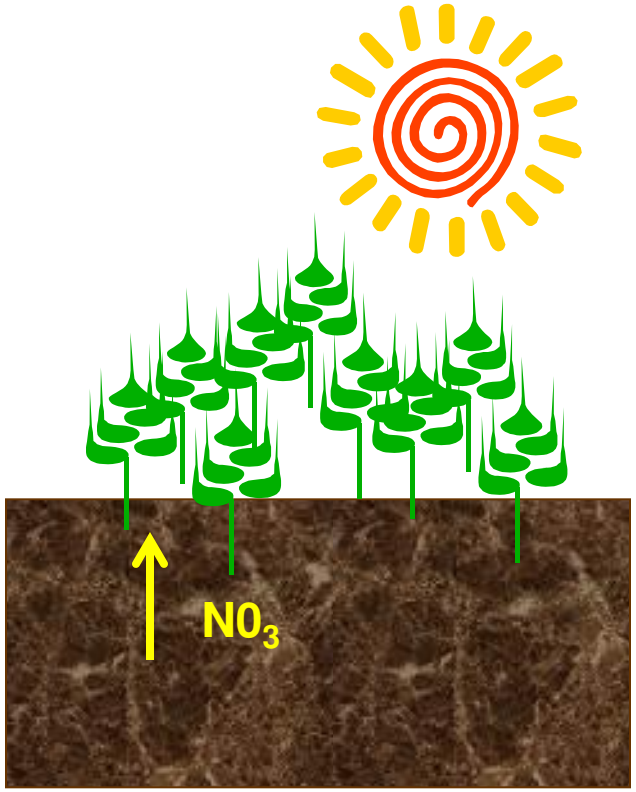
Fall vs Spring Applied Manure





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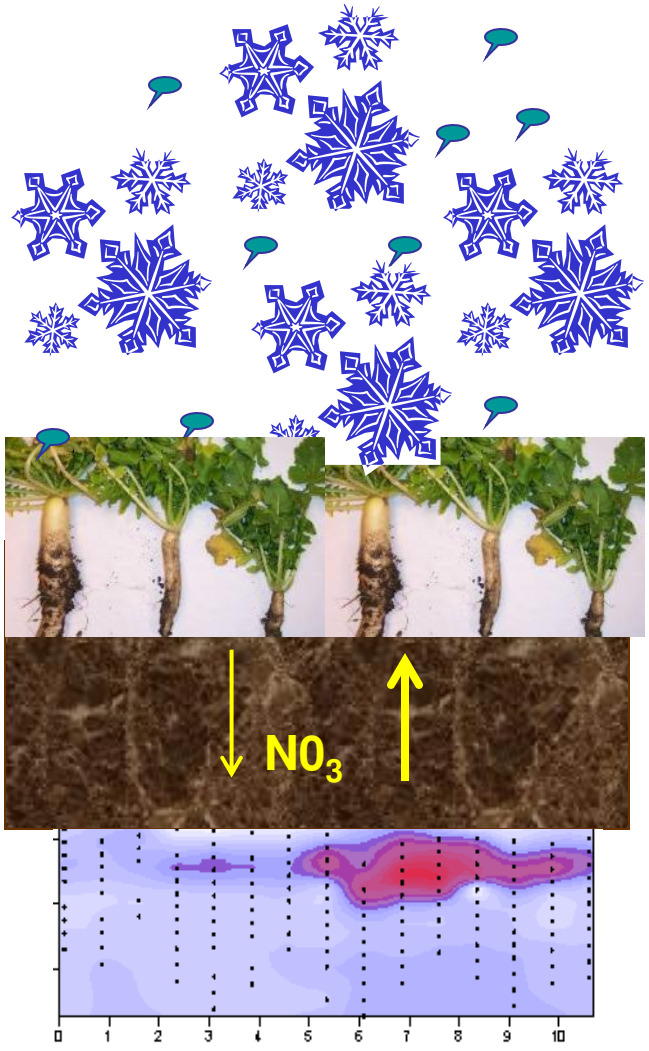

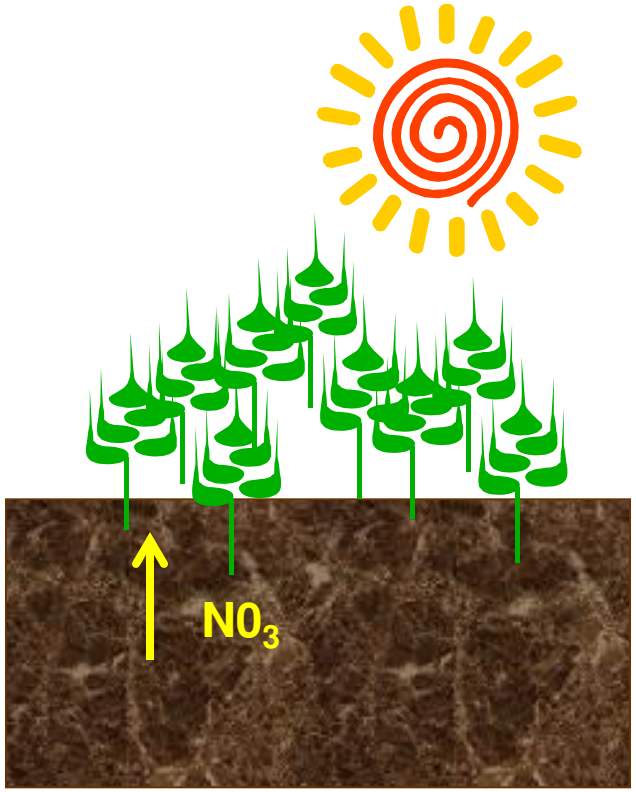

Cover Crop Biomass Production

Cover Crop	Dry Matter Produced lbs/ac
Red clover (plow-down)	2,403-4005
Oats	890-4895
Rye	890-3560
Oilseed Radish	1780 - 6675

Weather related variations from year to year

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Oilseed Radish (avg 2 reps)

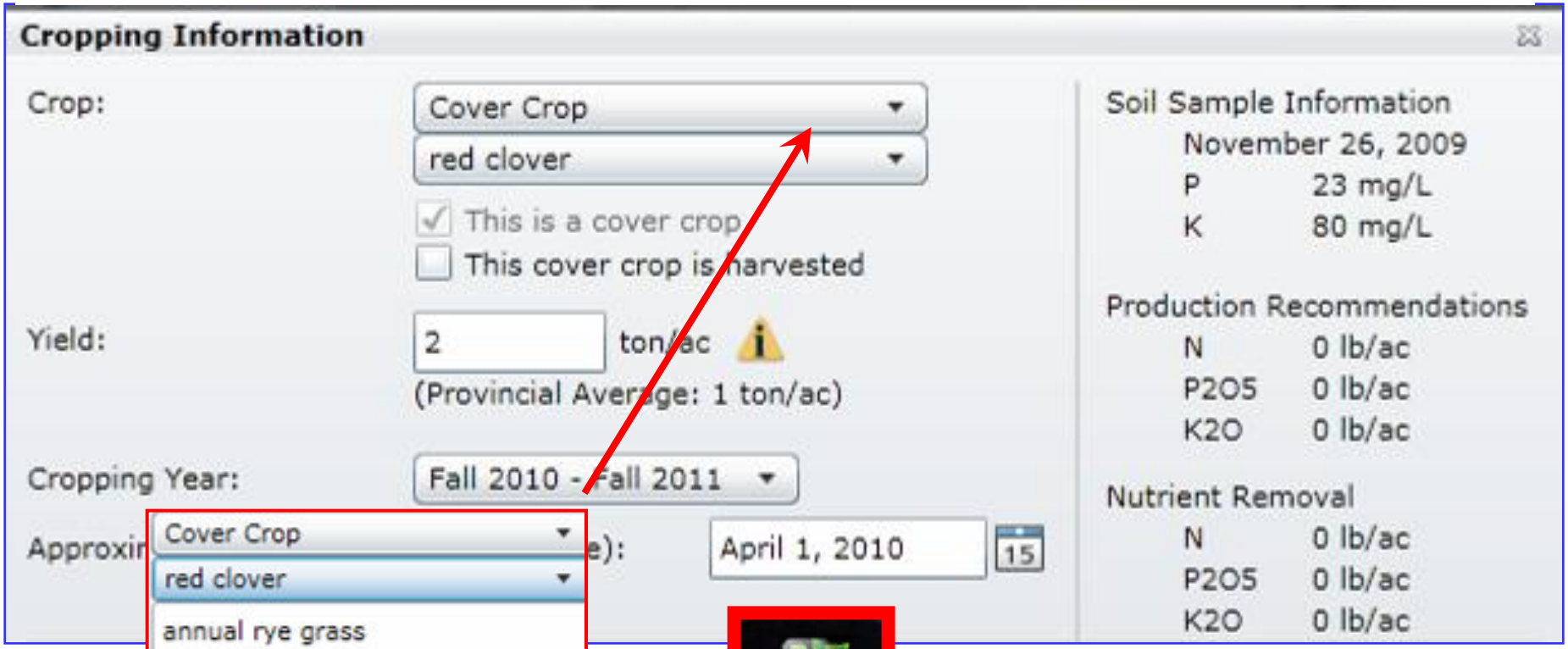
5,000 lbs/ac Oilseed Radish tops at 4.6%N =	230 lbs N/ac
3,800 lbs/ac Oilseed Radish roots at 2.3%N =	87 lbs N/ac
Total N uptake	**317** lbs N/ac

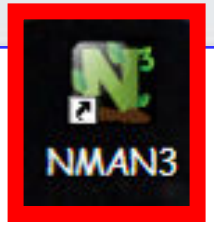
Horticulture Green House Gas Project 2003: Source: A Verhallen, Ridgetown

Manure vs no manure

Cover Crop	Manure	Biomass lbs/acre	Tissue N lbs/acre	Soil NO_3^- ppm
Oats	Y	4500	116	12.1
Oats	N	2816	41	8.9
Oilseed Radish	Y	5065	116	10.5
Oilseed Radish	N	2606	42	9.5
Peas	Y	5210	200	18.6
Peas	N	3490	140	12.0
Ryegrass	Y	4746	150	10.5
Ryegrass	N	1846	44	8.6
No Cover	Y	-		34.7
No Cover	N	-		18.1

NMAN3 - Nutrient Management Software





Cover Crop Options

-unless harvested, no change in nutrient balance

-fall cover crops benefit the next crop

-↓ the N loss of post harvest, fall-applied manure

Cropping Information

Crop: Cover Crop / red clover

This is a cover crop

This cover crop is harvested

Yield: 2 ton/ac

(Provincial Average: 1 ton/ac)

Cropping Year: Fall 2011 - Fall 2012

Approximate Planting Date (if applicable): March 16, 2011

Soil Sample Information
November 26, 2009
P 23 ppm
K 80 ppm

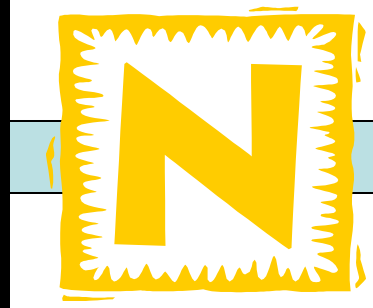
Production Recommendations
N 0 lb/ac
P2O5 0 lb/ac
K2O 0 lb/ac

Nutrient Removal
N 70 lb/ac
P2O5 36 lb/ac
K2O 120 lb/ac

Cover Crop
red clover
annual rye grass
hairy vetch
oats
oil seed radish
pea/oat mix
peas
red clover
sudan grass
sweet clover

Cover Crop Options

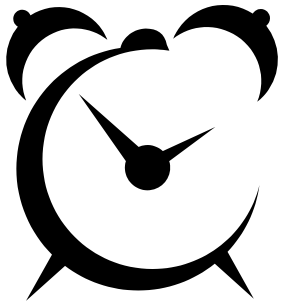
Availability of CC-N to succeeding crops



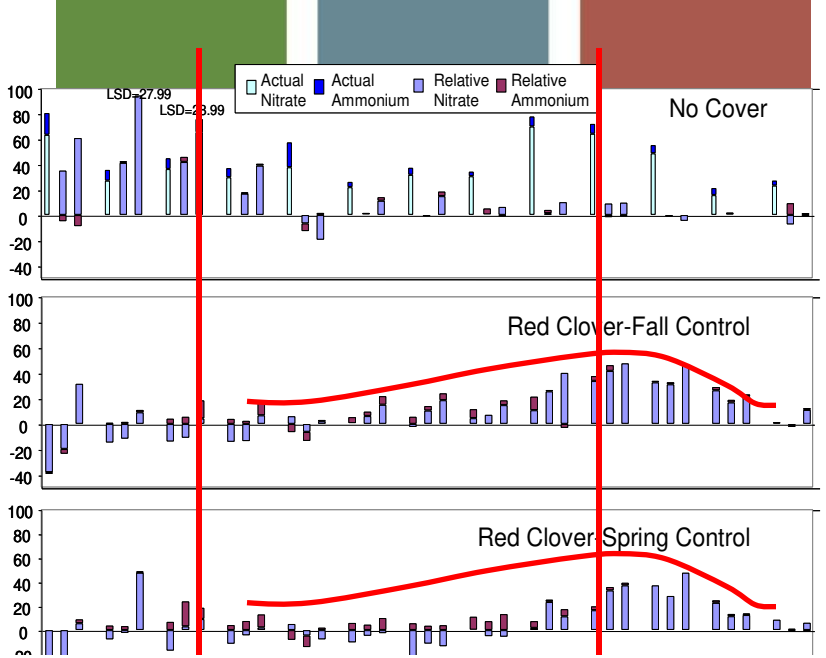
Amount of N

Time:

- killed
- breakdown
- uptake



Timing of Kill and Timing of N Release



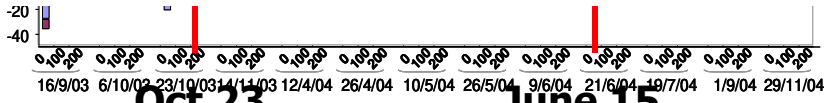
No Cover

Red Clover

Impact of cover crops on soil nitrate levels.

Bill Deen,

U of Guelph



How – Seeding Options – Beyond the Norm

Slurry Seeding

- Manure as a carrier
- Similar to broadcast
- Less moisture dependent
- Not all seed types

So let's talk about…

Oilseed Radish or Tillage Radish?

- The fit: Aug/early Sept, after manure – needs
- Cautions – smell, nitrogen loss, hard seed, setting seed
- Planting to flowering time
- Winter kills

What else might you see out there…

Cover Crop Mixes with Manure

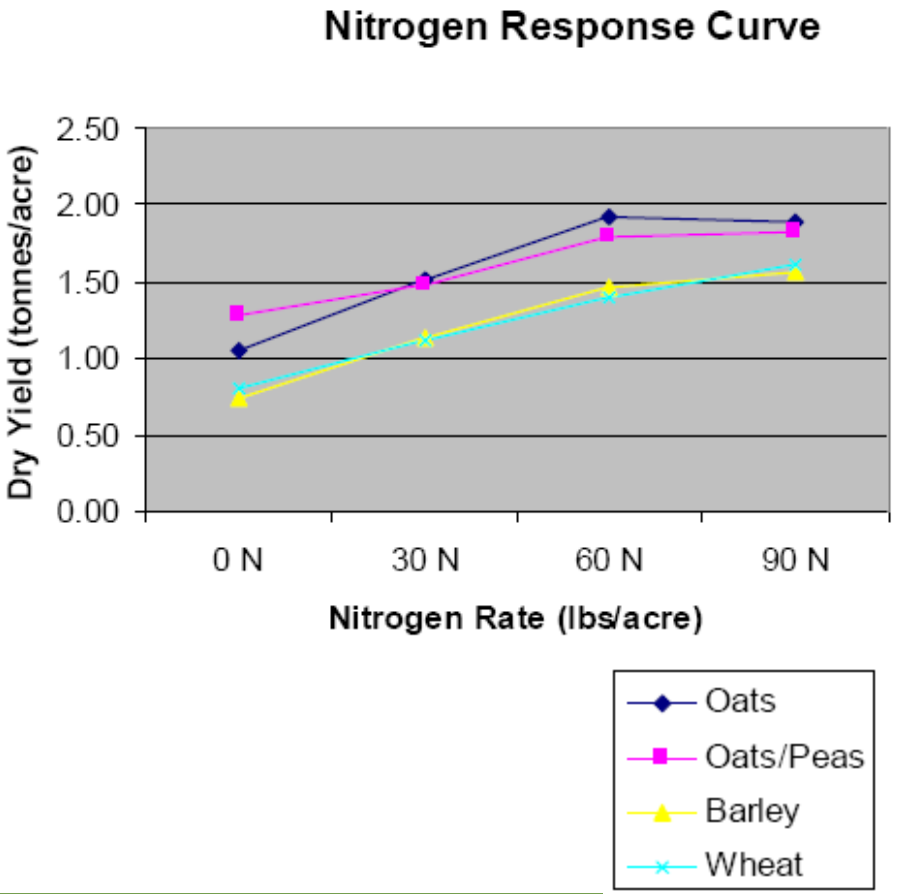
- Oats/OSR
- Rye or ryegrass/OSR
- Rye/vetch
- Peas/oats/OSR

Harvesting an Oat Cover Crop

Cover Crops – Forage Quality and Nutrient Uptake

Table 1: Average Yield Results from 4 Sites (tonnes/acre)

Treatment	0 N	30 N	60 N	90 N
70 lbs Oats	1.35	1.96	2.17	2.13
105 lbs Oats	1.27	1.92	2.04	1.97
140 lbs Oats	1.39	1.86	2.04	2.02
160 lbs Oats	1.53	2.07	2.13	2.14
70 lbs O+P	1.27	1.69	1.91	1.88
105 lbs O+P	1.42	1.87	2.05	2.02
140 lbs O+P	1.73	2.07	2.19	2.13
170 lbs O+P	1.56	2.00	2.05	2.17
90 lbs Barley	1.14	1.67	1.88	2.04
130 lbs Barley	1.08	1.54	1.82	1.99
170 lbs Barley	1.21	1.67	1.86	2.13
205 lbs Barley	1.11	1.64	1.89	2.05



Crop Advances:
http://www.ontariosoilcrop.org/docs/v9crpadv_for3-2012_cover_crops_for_emergency_forages_interim_report.pdf

Planting Wheat after OSR /Pea cover (biosolids)

Red Clover Injected with Manure into Corn crop

Oilseed Radish inter-row seeded with wheat/oats

Cover Crop Function	Best choices for Cover Crops
Nitrogen production	Red clover, peas, vetch, soybeans
Nitrogen scavenging	Fall uptake - Oilseed radish and other brassicas, oats Winter/spring uptake – rye, winter wheat Mixes
Weed suppression	Oilseed radish and other brassicas, winter rye Buckwheat
Soil structure building	Oats, overwintered winter rye, annual ryegrass
Emergency Forage	**Fall**: Oats, barley, wheat, rye, forage brassicas **Summer:** millets, sorghum, sudangrass, sorghum-sudan
Biomass return to soil	Fall – oats, oilseed radish Summer – millets, sorghum, sudan
Erosion protection (i.e. wind, water)	Winter rye, winter wheat, ryegrass (well established) spring barley, oats

Christine Brown
Nutrient Management Lead – Field Crops
Ministries of Agriculture & Food, and Rural Affairs - Woodstock
519-537-8305
christine.brown1@ontario.ca