Corn

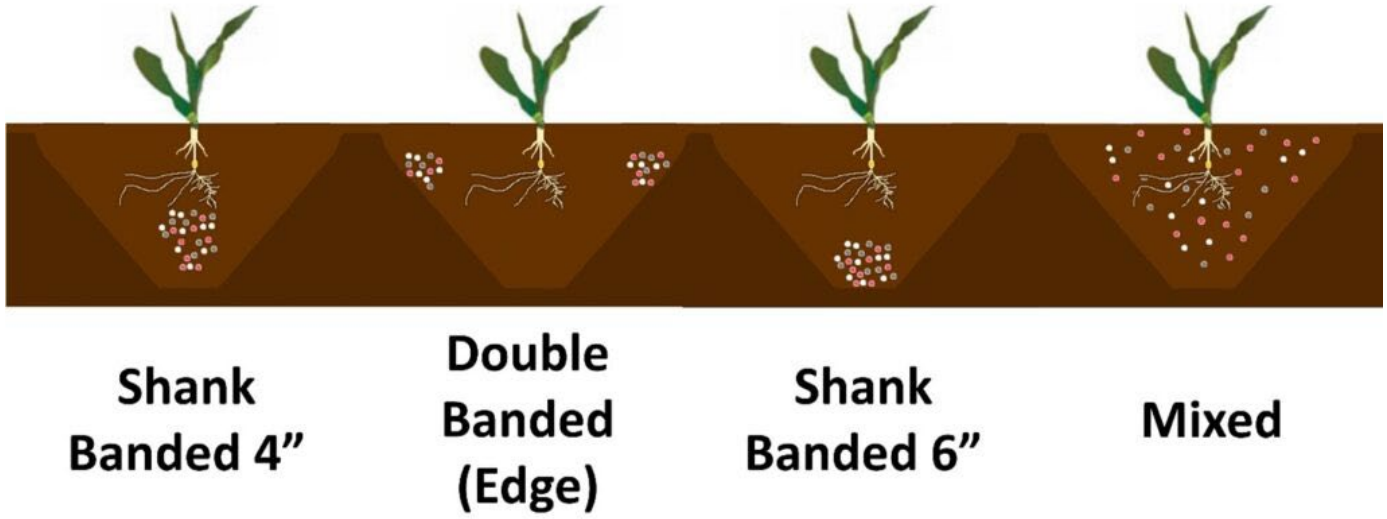
Ben Rosser

OMAFA Corn Specialist

Ontario

Strip Till

Strip Till



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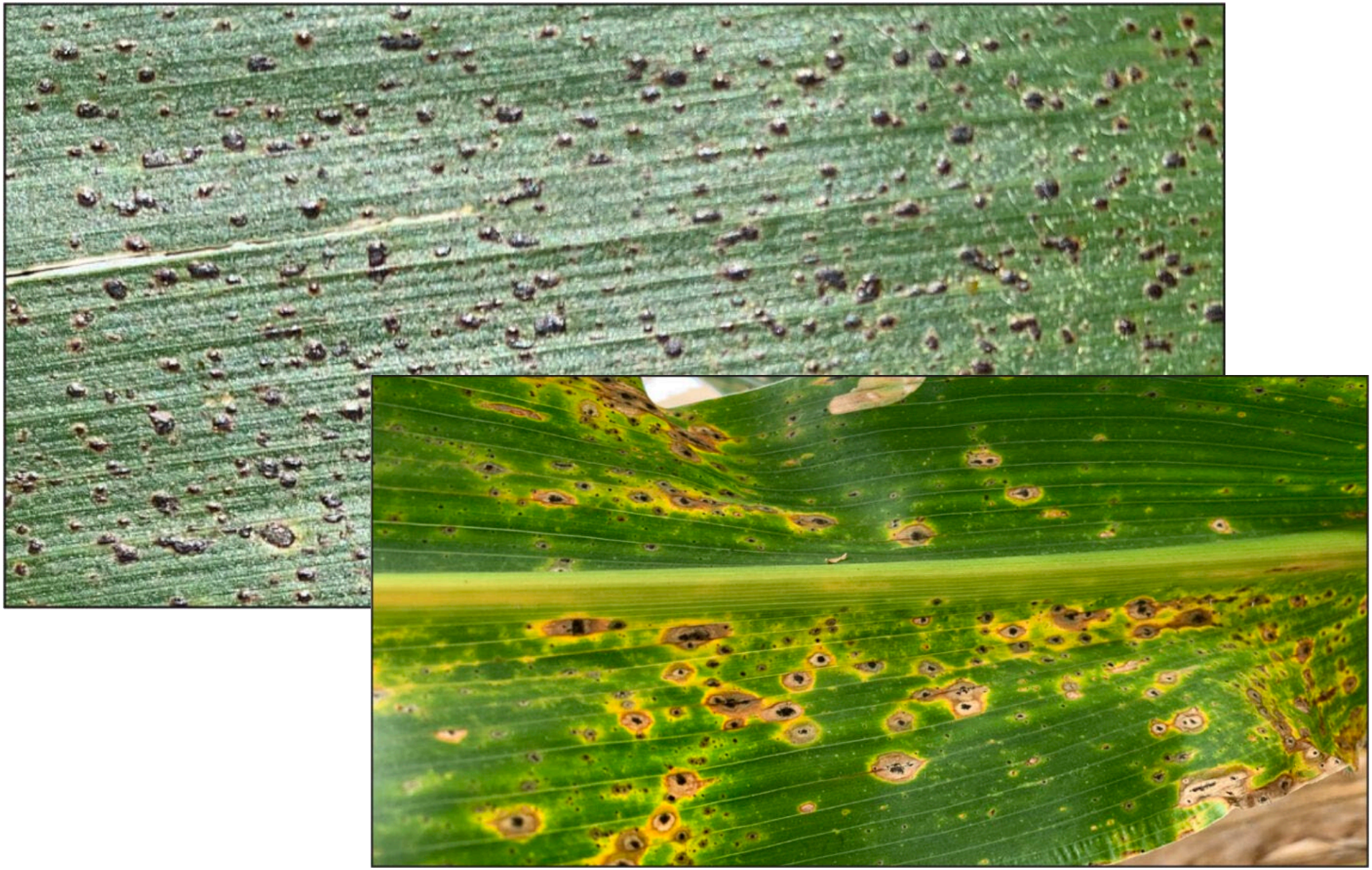


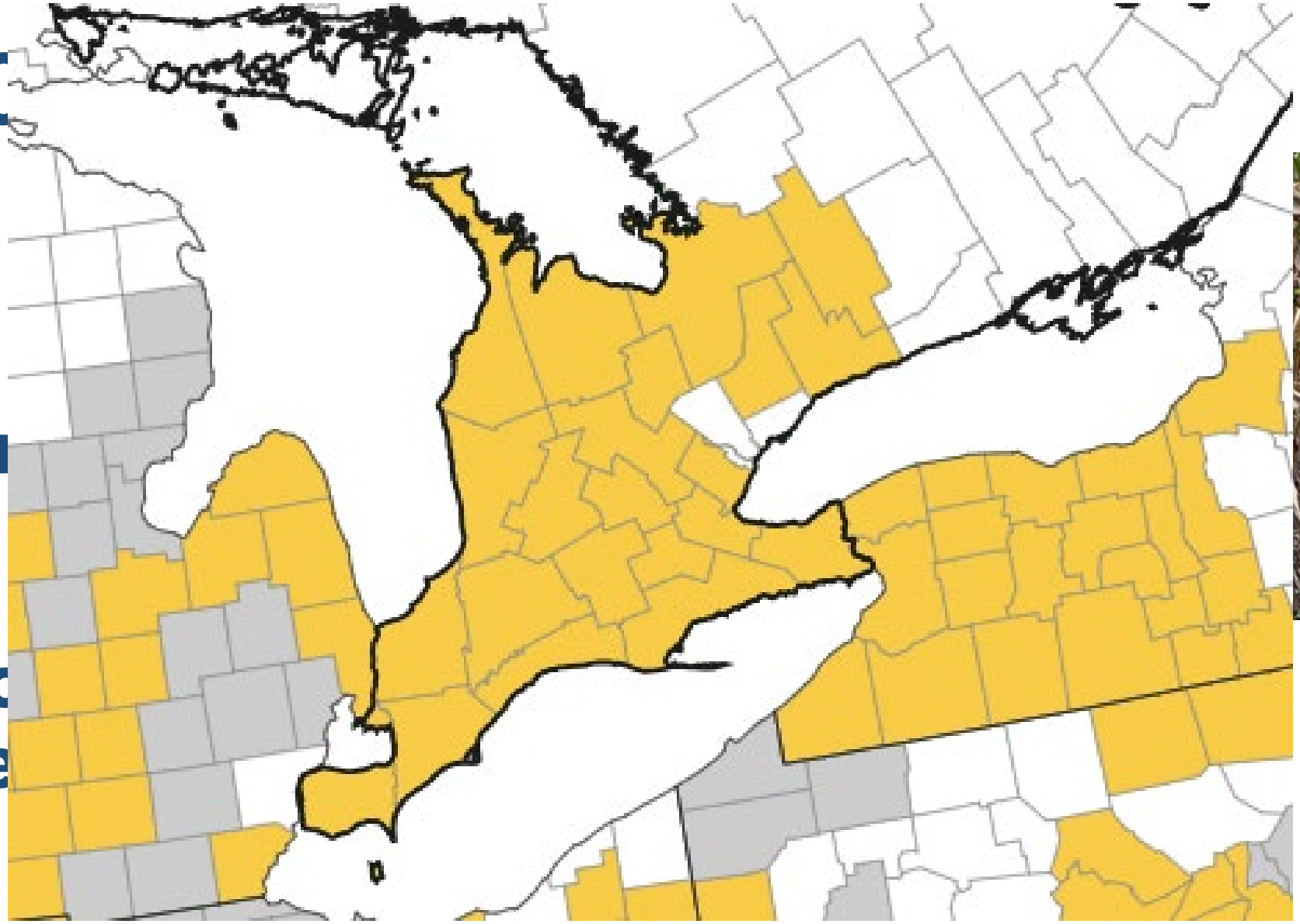
Why The Big Deal About Tar Spot?

2024 Elgin Crop Projects

Fungicide on Corn

Veltyma DLX: **234 bu/ac**

Why The Big Deal About Tar Spot?



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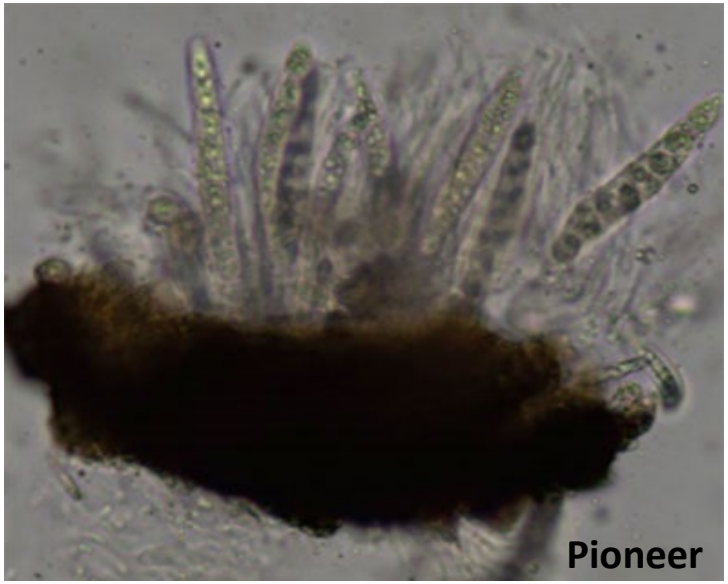
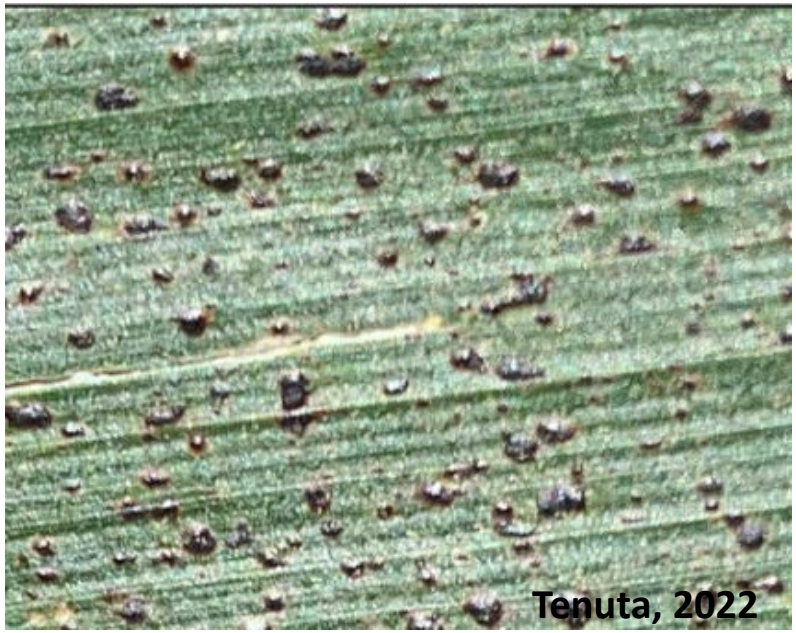
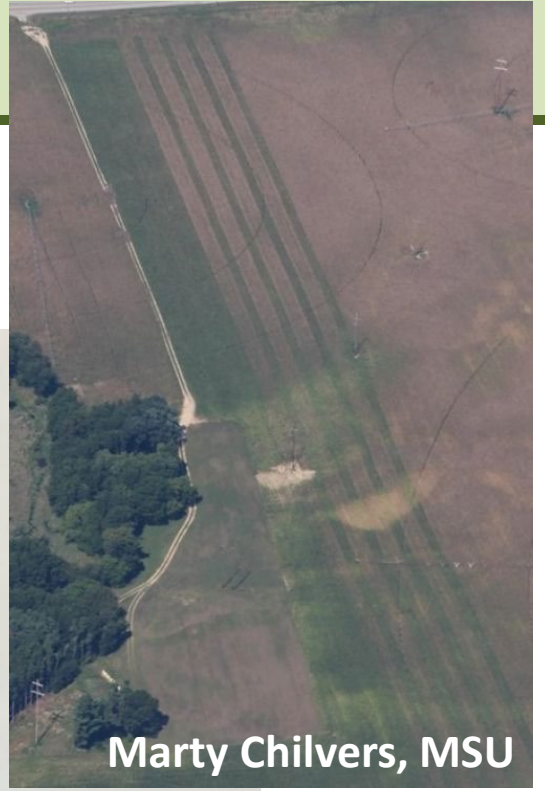
Tar Spot Lifecycle?

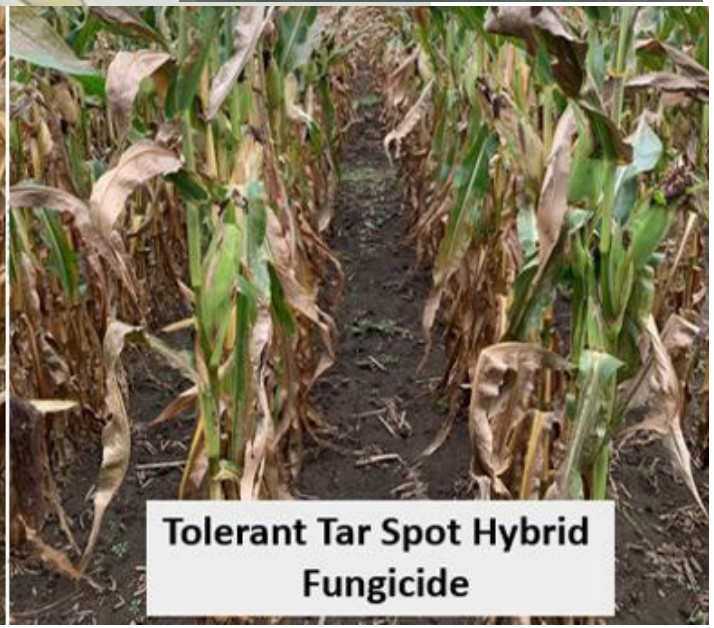




Management?

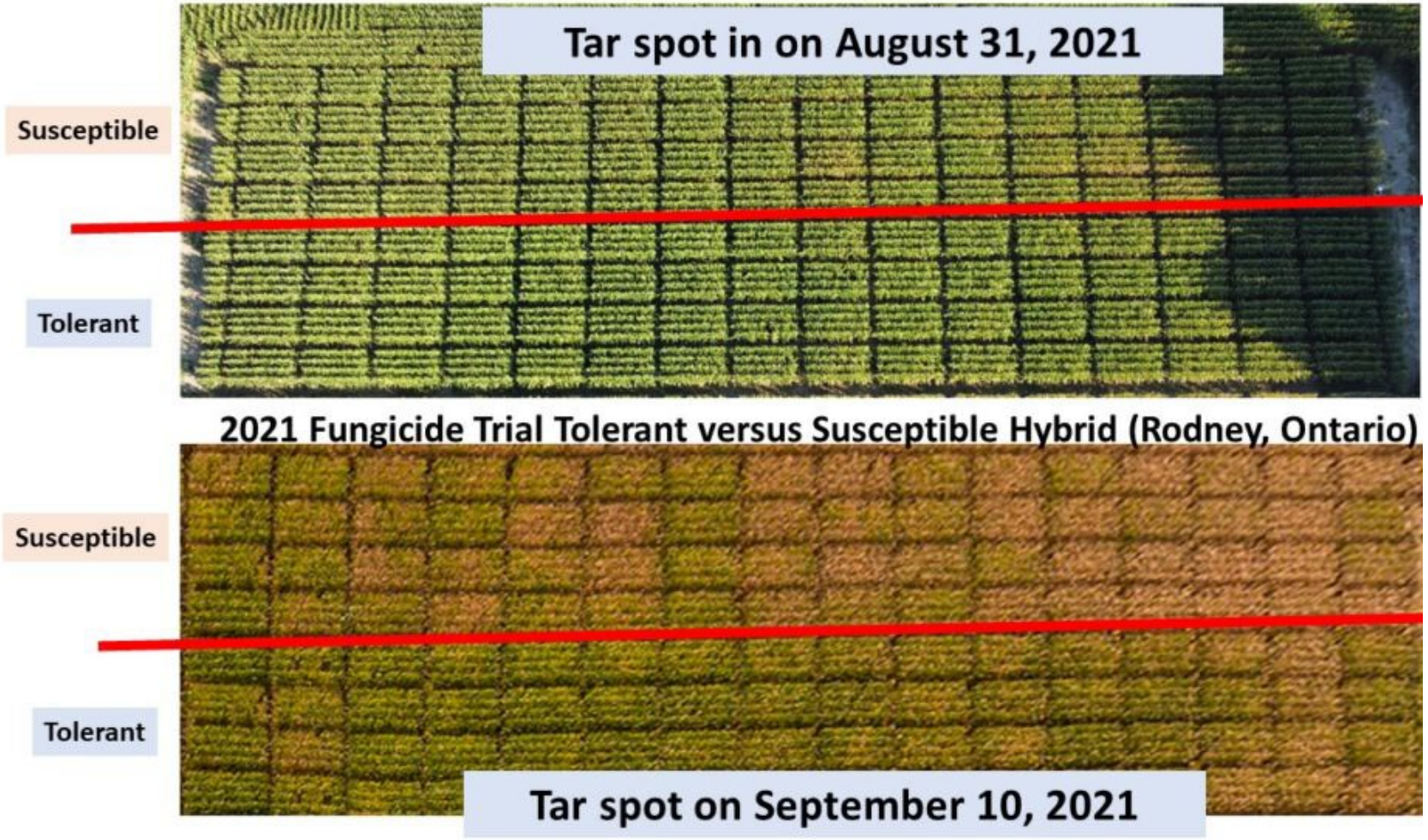

Marty Chilvers, MSU


Susceptible Tar Spot Hybrid
Fungicide


Tolerant Tar Spot Hybrid
Fungicide

Management?

Fungicides?



Tenuta, 2022

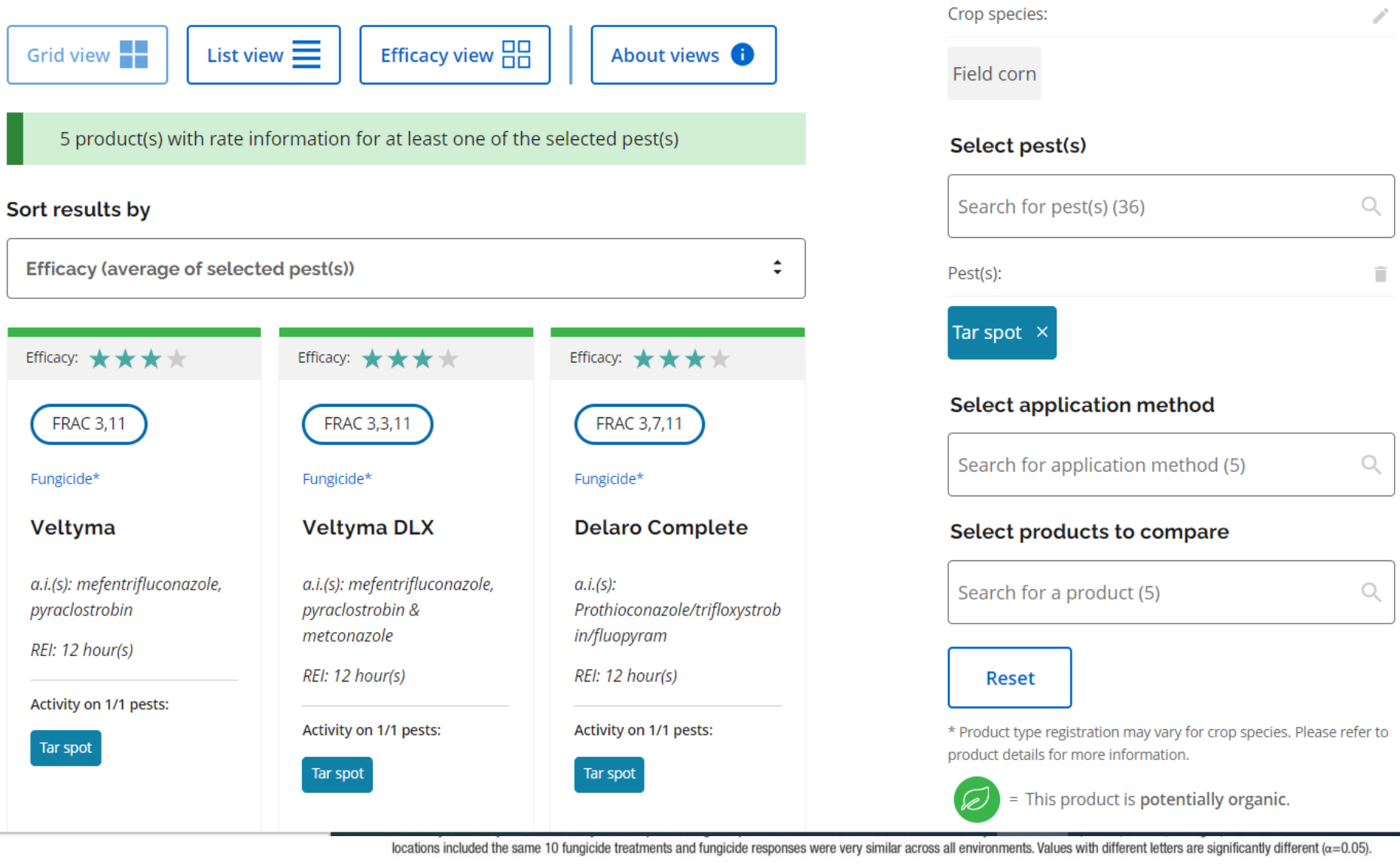
Management?

Fungicides?

- **Protect ear, mid-canopy leaves during grain fill**
- **Staging?**
- **Product?**

Google: "Crop Protection Hub"

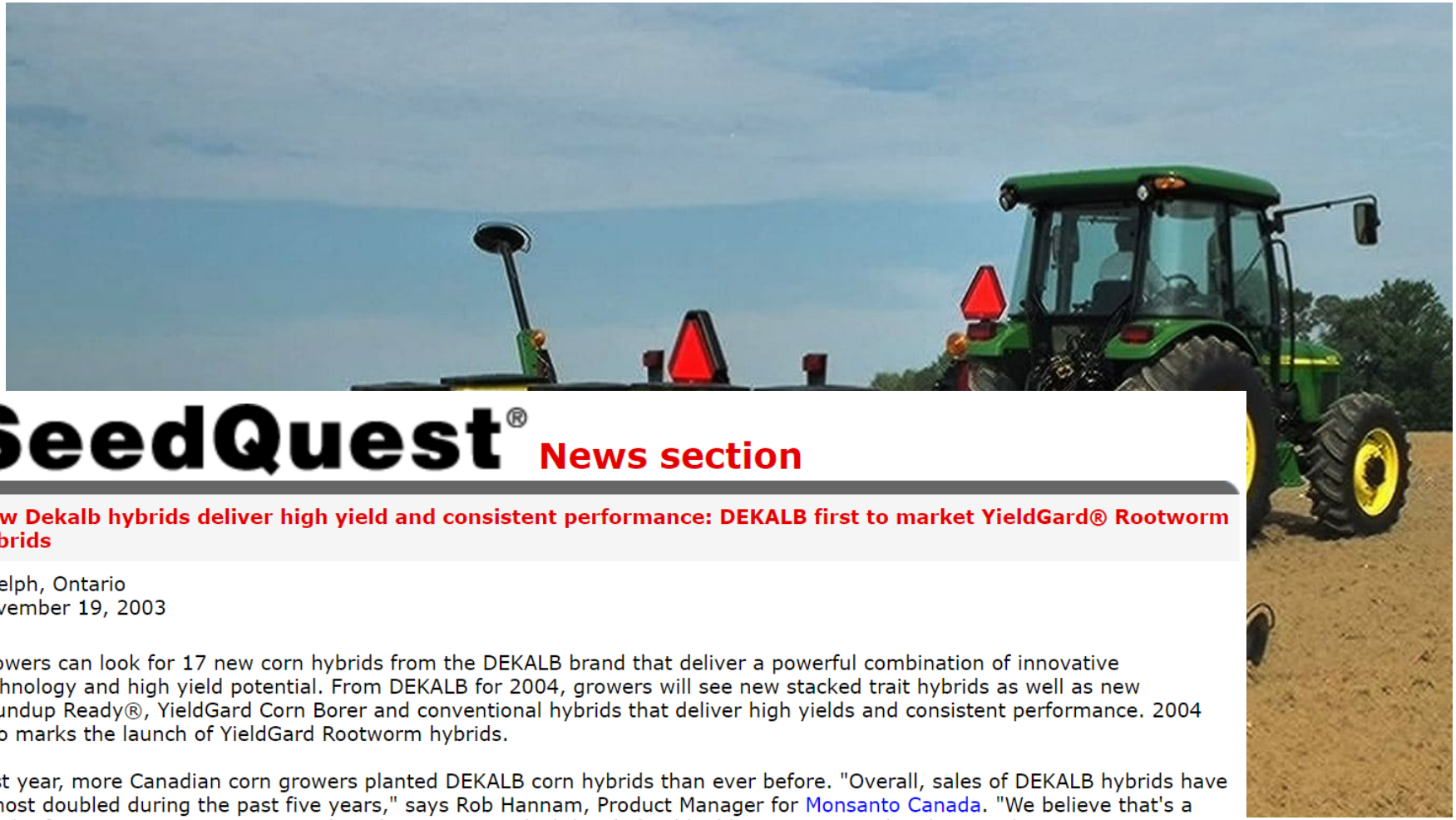
Management?



locations included the same 10 fungicide treatments and fungicide responses were very similar across all environments. Values with different letters are significantly different (α=0.05).

Corn Rootworm

Corn Rootworm



SeedQuest® News section

New Dekalb hybrids deliver high yield and consistent performance: DEKALB first to market YieldGard® Rootworm hybrids

Guelph, Ontario
November 19, 2003

Growers can look for 17 new corn hybrids from the DEKALB brand that deliver a powerful combination of innovative technology and high yield potential. From DEKALB for 2004, growers will see new stacked trait hybrids as well as new Roundup Ready®, YieldGard Corn Borer and conventional hybrids that deliver high yields and consistent performance. 2004 also marks the launch of YieldGard Rootworm hybrids.

Last year, more Canadian corn growers planted DEKALB corn hybrids than ever before. "Overall, sales of DEKALB hybrids have almost doubled during the past five years," says Rob Hannam, Product Manager for Monsanto Canada. "We believe that's a result of our commitment to research and innovation, which has helped build a DEKALB product line-up that gives growers consistently high-yielding corn seed technology they can trust."

The DEKALB line-up will include five new Roundup Ready Corn 2/YieldGard Corn Borer stacked trait hybrids that deliver innovative technology which helps maximize yield potential.

Corn Rootworm

J. Smith, 2020

Corn Rootworm

Management?

- Crop Rotation!
  - Full crop rotation
  - Reduced COC w Bt management

Corn Rootworm

Management?

- Crop Rotation!
  - Full crop rotation
  - Reduced COC w Bt management
- Insecticide

Corn Rootworm

Management?

- Crop Rotation!
  - Full crop rotation
  - Reduced COC w Bt management
- Insecticide
- New insecticide technologies

Corn Rootworm

Management?

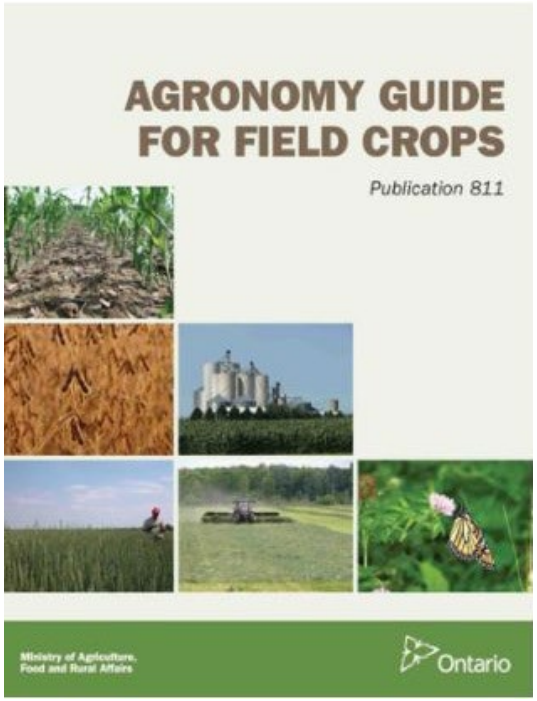
- Crop Rotation!
  - Full crop rotation
  - Reduced COC w Bt management
- Insecticide
- New insecticide technologies
- Biocontrol nematodes?

Resources?

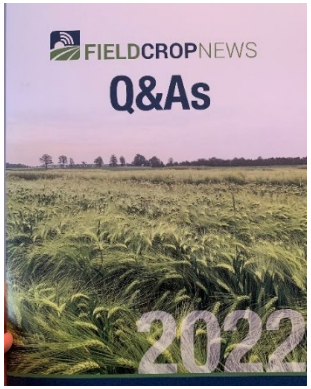
- Field Crop News

FIELDCROPNEWS

- Agronomy Guide for Field Crops (Pub811)



- Field Crop Q&A Booklet



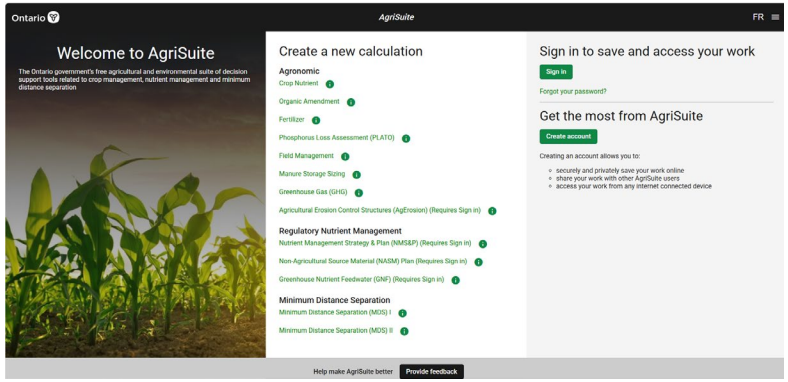
Resources?

- Crop Protection Hub

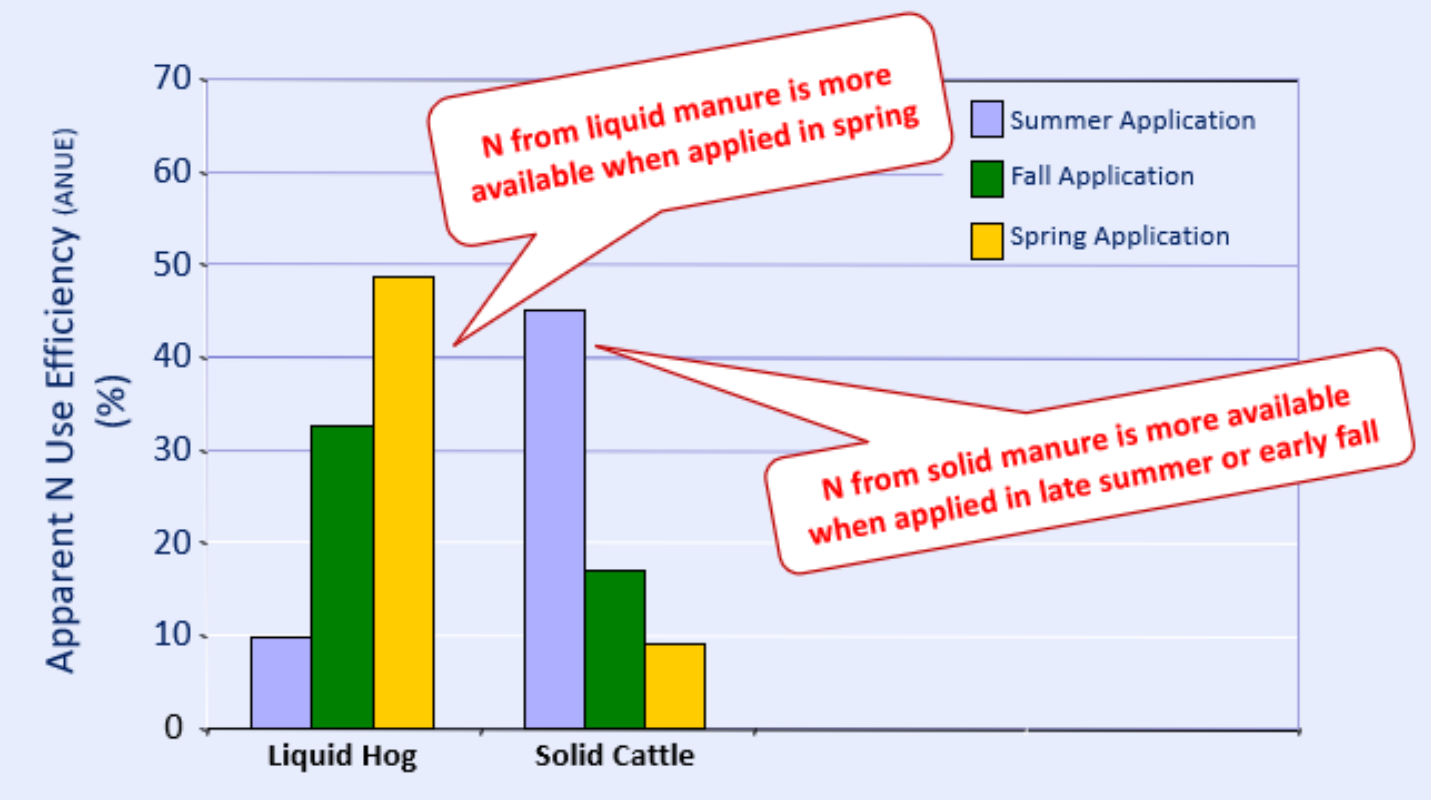
- Crop Protection Network

CROP PROTECTION NETWORK
A Product of Land Grant Universities

- Agrisuite



Timing of Application – Liquid vs Solid Manure



Improving nitrogen efficiency from manure

~ Available nitrogen as a percent of total N for manure with high NH_4-N (=solid manure)

High NH_4-N Material	Application Timing					
Incorporation details	Late Summer	Late Summer with cover crop	Early Fall	Early Fall with cover crop	Late Fall	Spring
Injected (immediate incorporation)	**22** (30)	**47** (45)	**38** (40)	**47** (45)	**47** (45)	**76** (36)
Incorporated 1 days	**22** (30)	**47** (45)	**38** (40)	**42** (45)	**47** (45)	**60** (30)
Incorporated 2 -3 days	**22** (30)	**36** (45)	**32** (40)	**36** (45)	**36** (45)	**46-52** (25)
Incorporated 4 -5 days	**22** (30)	**25** (45)	**25** (40)	**25** (45)	**25** (45)	**40-43** (21)
Surface applied (bare soil, standing crop or crop residue)	**22** (30)	**25** (45)	**25** (40)	**25** (45)	**25** (45)	**37-55** (18-27)
Liquid Manure with 60% of Total N as NH_4-N (Solid Manure with 25% of Total N as NH_4-N) (e.g., liquid finisher hog manure and solid cattle manure)						

Exceptions:

- High pH, warm weather
- Crops that need N during early season (winter wheat, winter canola)

~ $25/1000 gal increase in N value from late summer to spring injected for liquid finisher manure

Ontario

2023-2024 Manure Study Results

Liquid beef manure side-dressed into standing corn

Results compiled by:
Laura Scott OMAFA
Christine Brown OMAFA

2023 Liquid Beef Manure – Side-dress plot

Near Van Camp, E. Ontario
Carp Clay loam
Grenville Loam

Average Soil Fertility:

pH	5.6
P	20 ppm
K	169 ppm
OM	5.5 %

Manure Project – 2023 – manure injected at side-dress

Soil test – 20 ppm P 169 ppm K OM 5.5% pH 5.6	Fertilizer Treatment	Manure Treatment
Preplant fertilizer 24-12-16-2.2 S @375 lbs/ac	90 – 45 – 60 - 8S	90 – 45 – 60 - 8S
P9466AML planted May 11 with 5 gal/ac 6-24-6	4-16-4	4-16-4
Commercial Fertilizer surface applied at 6-leaf	89 – 0 – 60 - 8S	---
4,000 gal/ac beef feedlot manure injected at 6 leaf	---	178 – 280 - 120
Nutrients Applied	184 – 60 - 123	273 -340 - 183
Harvest Oct 25th 2023 Yield (moisture)	**204.3** (24.3 %)	**234** (26.7 %)
Nutrients removed	169 – 86 - 59	194 – 98 - 68
Nutrient Balance	15 - (-26)- 64	79 – 242 - 115
Economics $/ac $ grain – drying/trucking – fertilizer – SD application	**$ 677** ($500 US)	**$ 827 + ~$ 250** $600 + ~ $185 US

Approximate change in soil test: 22 ppm P; 180 ppm K

Economics (CAD)

- corn @ $5.60/bu; drying + carbon @ $0.69/bu; trucking $0.288/bu
- N $0.78/lb; P_2O_5 $0.78/lb; K_2O $0.53/lb
- Manure Application @ $0.025/gal; fertilizer SD application @$12/ac

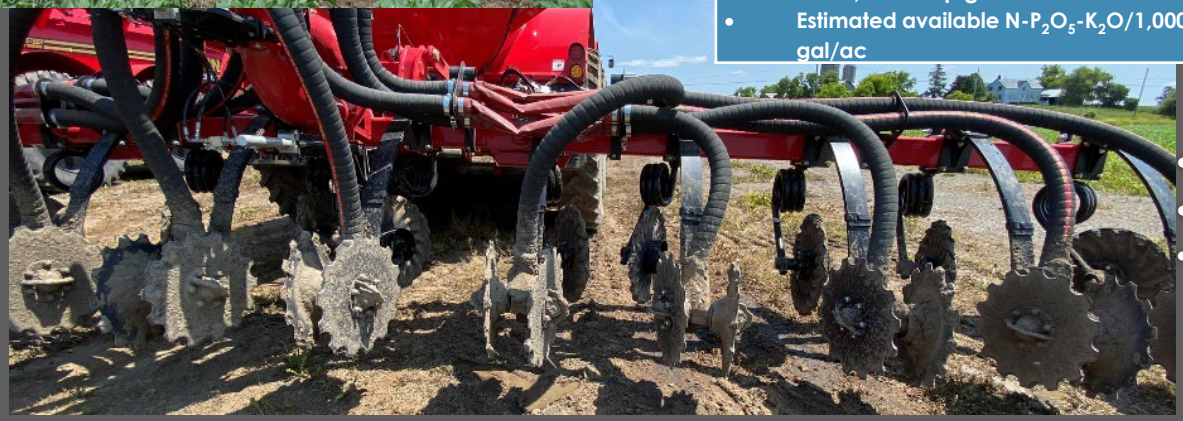
2024 Liquid Beef Manure – Side-dress plot

Near Vernon, Ontario
Brandon Silty Clay loam

Average Soil Fertility:

pH	5.8
P	55 ppm
K	173 ppm
OM	5.2 %

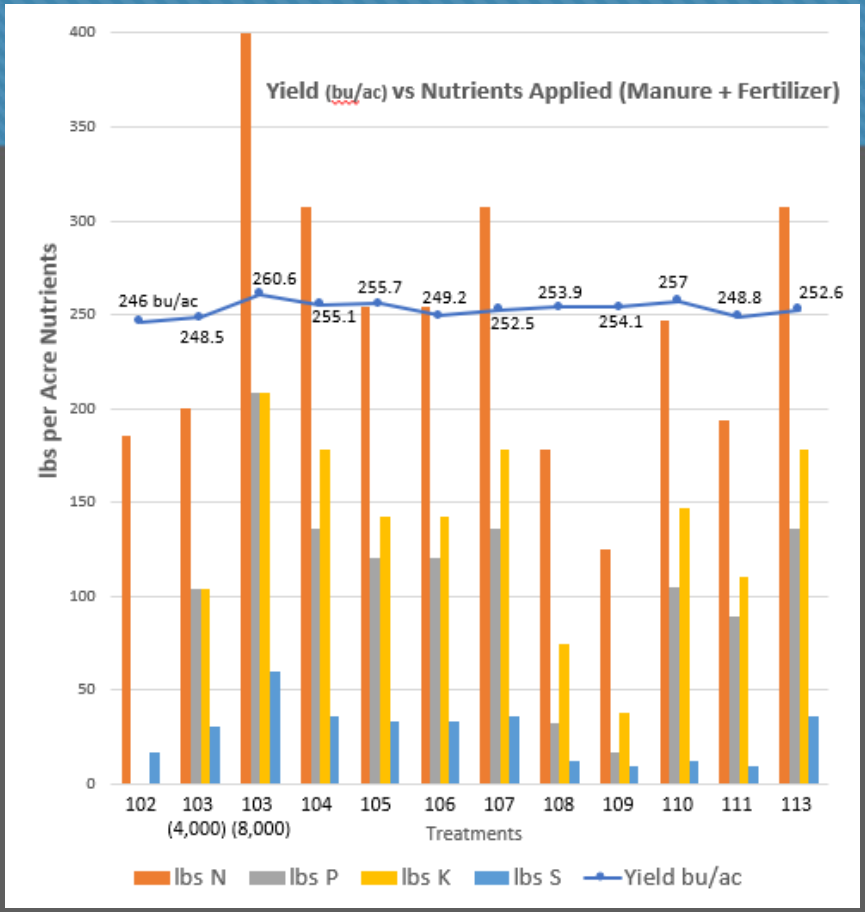
Manure Project – 2023 and 2024



Treatment #	Up-front/pre-plant broadcast	Sidedress treatment
102	0lbs/ac	185-0-0-17S
103 x4000gal	0lbs/ac	4000gal manure injected
103 x8000gal	0lbs/ac	8000gal manure injected
104	107-33-75-6S lbs/ac	4000gal manure injected
105	55-17-38-3S lbs/ac	4000gal manure injected
106	55-17-38-3S lbs/ac	4000gal manure Surface applied
107	107-33-75-6S lbs/ac	4000gal manure injected
108	107-33-75-6S lbs/ac	71-0-0-6.5S
109	55-17-38-3S lbs/ac	71-0-0-6.5S
110	107-33-75-6S lbs/ac	2800gal manure injected
111	55-17-38-3S lbs/ac	2800gal manure injected
112	55-17-38-3S lbs/ac	2800gal manure injected
113	107-33-75-6S lbs/ac	4000gal manure injected

- Feedlot Beef Manure analysis: 11 % DM
- 80 lbs/1000 Imp gal Total N with ~60 % as NH_4-N
- Estimated available N-P_2O_5-K_2O/1,000 Imp gal: ~50-31-31 (Agrisuite) 40-26-26/1,000 US gal/ac

- Site location: near Ottawa Ont.
- Liquid Feedlot Beef manure
- ~ 40-26-26 avail N-P-K/1,000 US gal



North Gower side-by-side – manure injected at side-dress %~ $ 51 ($ 37 USD) difference in yield profit

Treatment #	Up-front/pre-plant broadcast	Sidedress treatment
102	0lbs/ac	185-0-0-17S
103 x4000gal	0lbs/ac	4000gal manure injected
103 x8000gal	0lbs/ac	8000gal manure injected
104	107-33-75-6S lbs/ac	4000gal manure injected
105	55-17-38-3S lbs/ac	4000gal manure injected
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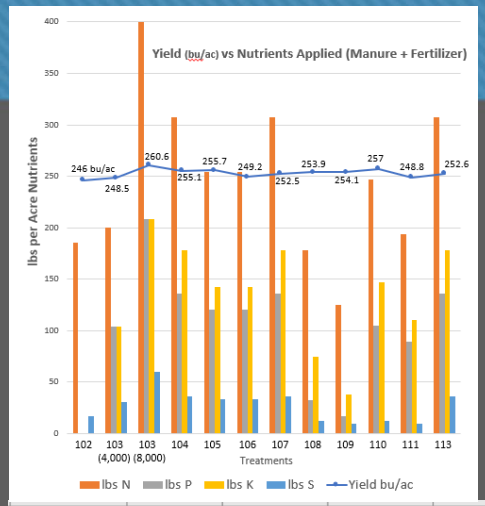
- Estimated available N-P_2O_5-K_2O/1,000 Imp gal: ~50-31-31 (Agrisuite) 40-26-26/1,000 US gal/ac

Average Soil fertility level:
pH 5.8; P (Sodium Bicarb) 55 ppm; K=173 ppm; 5.2% OM

Project Economics – Cost /bu of corn



Treatment #	bu/ac	Revenue	Expenses	Profit
102	246	$1,286.29	$ 614.20	$ 672.09
103 x4000	248.5	$1,299.70	$ 742.80	$ 556.90
103 x8000	260.6	$1,362.85	$1,042.80	$ 320.05
104	255.1	$1,333.75	$ 936.20	$ 397.55
105	255.7	$1,337.21	$ 845.49	$ 491.72
106	249.2	$1,303.01	$ 845.49	$ 457.52
107	252.5	$1,320.59	$ 936.20	$ 384.39
108	253.9	$1,327.96	$ 711.63	$ 616.33
109	254.1	$1,328.52	$ 716.89	$ 611.63
110	257	$1,343.83	$ 846.20	$ 497.63
111	248.8	$1,301.15	$ 755.49	$ 545.66
113	252.6	$1,320.79	$ 936.20	$ 384.59

Treatment #	Up-front/pre-plant broadcast	Sidedress treatment	Cost / bu (CAD)	Cost /bu accounting for manure
102	0lbs/ac	185-0-0-17S	$ 2.50	(US gal)
103 x4000gal	0lbs/ac	4000gal manure injected	$ 2.99	$ 1.86
103 x8000gal	0lbs/ac	8000gal manure injected	$4.00	$ 1.84
104	107-33-75-6S lbs/ac	4000gal manure injected	$ 3.67	$ 2.57
105	55-17-38-3S lbs/ac	4000gal manure injected	$ 3.31	$ 2.20
106	55-17-38-3S lbs/ac	4000gal manure Surface applied	$ 3.39	$ 2.26
107	107-33-75-6S lbs/ac	4000gal manure injected	$ 3.71	$ 2.59
108	107-33-75-6S lbs/ac	71-0-0-6.5S	$ 2.80	
109	55-17-38-3S lbs/ac	71-0-0-6.5S	$ 2.82	
110	107-33-75-6S lbs/ac	2800gal manure injected	$ 3.29	$ 2.53
111	55-17-38-3S lbs/ac	2800gal manure injected	$ 3.04	$ 2.24
112	55-17-38-3S lbs/ac	2800gal manure injected	---	---
113	107-33-75-6S lbs/ac	4000gal manure injected	$ 3.71	$ 2.59

- Feedlot Beef Manure analysis: 11 % DM
- Estimated available N-P_2O_5-K_2O/1,000 Imp gal: ~50-31-31 (Agrisuite) **40-26-26/1,000 US gal/ac**

Average Soil fertility level: pH 5.8; P (Sodium Bicarb) 55 ppm; K=173 ppm; 5.2% OM

How far can we afford to move manure?

- Beef manure: 11% DM Feedlot Beef Manure analysis: 11 % DM
- Estimated available N-P_2O_5-K_2O/1,000 Imp gal: ~50-31-31 (Agrisuite)
  40-26-26/1,000 US gal/ac
- **Cost of handling/application $7.50/1000 gal (CAD)**
- **Cost of transport ~ 10 km to field $ 2.50/1000 gal**
- $85.40 available N-P-K value = $ 75/1000 gal after transport and application
- Compared to Liquid Sow manure (1.7% DM 15 – 11 – 12 est. available N-P-K)
- ~ $25 /1000 gal value
- **$ 10/1000 gal for 11 % DM and 2% DM (expensive to transport water)**

Measuring Ammonia Loss with Dosimeter Tubes

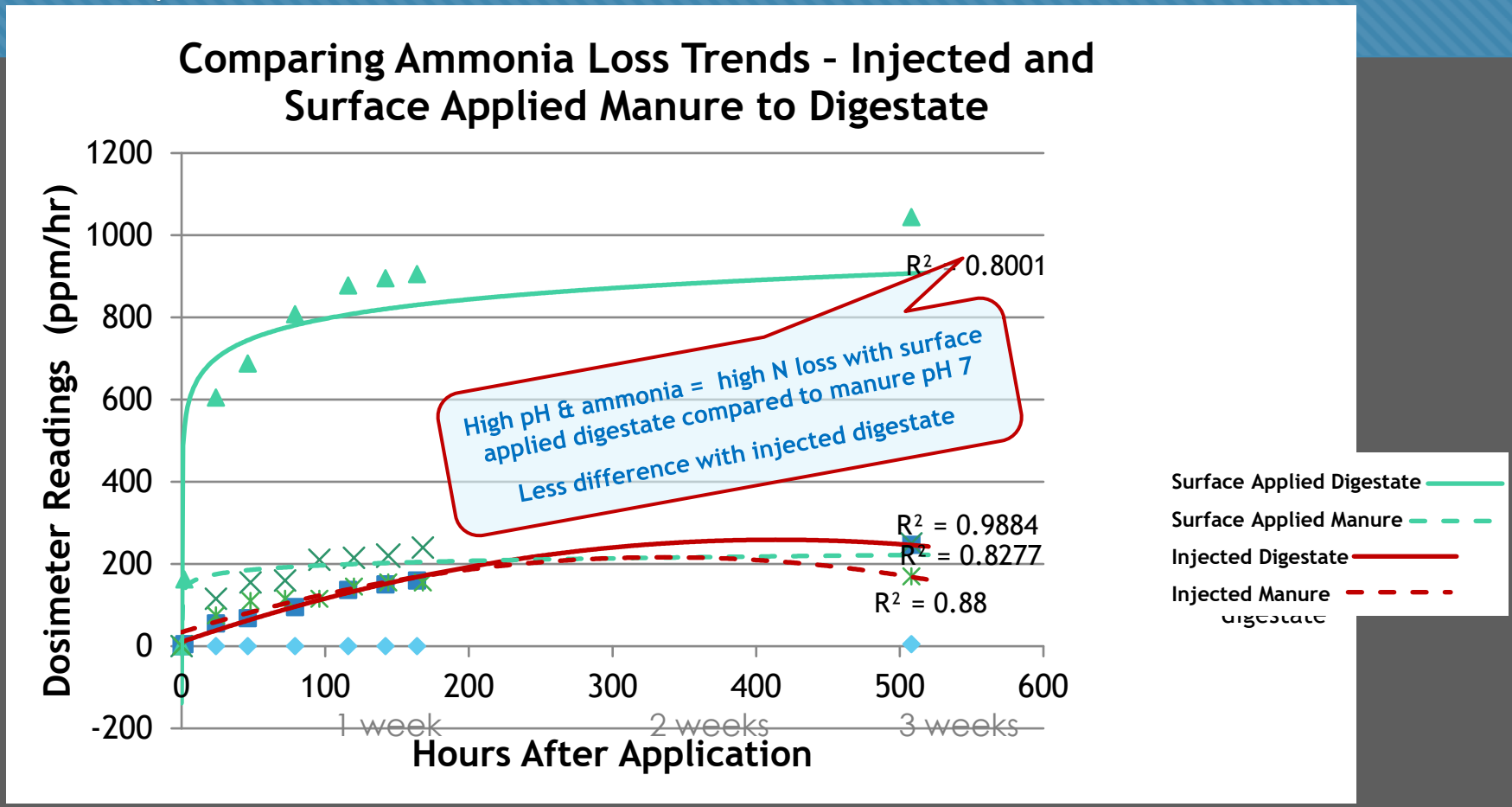
Ammonia loss – up to 2/3 of the ammonia-N

- Higher the pH the higher to Ammonia loss
- Sunny, warm, windy conditions = higher ammonia loss
- Highest in the 1st 24 hours – “pooled” areas

Rainfall after surface application reduces ammonia loss.

Manure pH and Ammonia Loss

from earlier application studies into forages and after wheat with cover crops



Observations:

Liquid Feedlot Beef : 11 % DM, 67 lbs/1000 US gal Total N with 47 lbs as NH_4-N

11% DM; 81 lbs/1000 Imp gal total N - 62% N as ammonium-N ; 32 lbs P2O5; 31 lb K2O

- Fertilizer: 110 lbs/ac, 55 lbs/ac or no fertilizer N at planting

Average of all treatments – 30 lbs/ac total ammonia loss or 7.5% of manure NH_4-N (range 6 lbs to 75 lbs/ac loss)

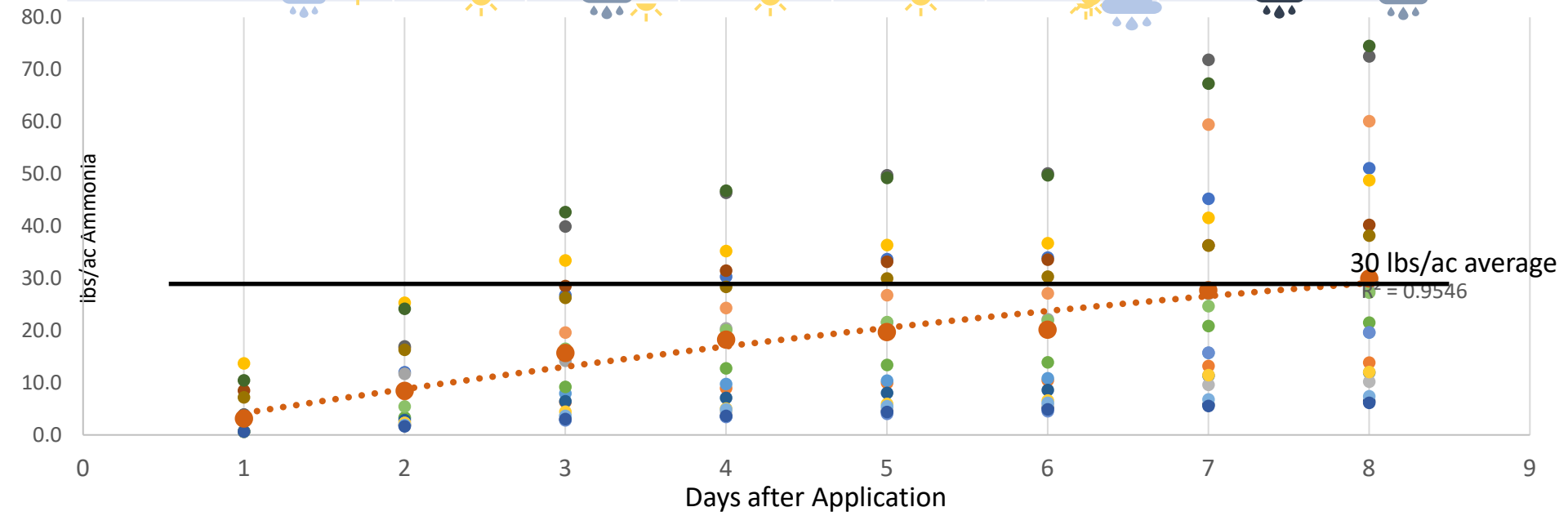
Ammonia Loss by treatments:

- ~ 51 lbs/ac (~30% ave) for **4,000 gal/ac surface applied** (range 38 to 75 lbs/ac loss or 20-40%) with 55 lbs/ac fertilizer N
- ~ 35 lbs/ac or 9.4% average (19.6 – 51.1 lbs/ac or 4.5 - 14% range) for **8,000 gal/ac injected with 0 fertilizer N**
- ~ 10 lbs/ac or 5.4 % average (6.5 - 13.8 lbs/ac or 3.3 – 7.3 % range) for **4,000 gal injected with 0 fertilizer**
- ~ 24 - 47 lbs/ac 13 - 25 % average for **4,000 gal injected** with 110 lbs/ac fertilizer N
- ~ 27 % average (10 – 60 lbs/ac or 8 – 46% range) for **2,800 gal/ac injected** with 110 lbs/ac fertilizer N
- ~ 7.3 % average (7.4 – 12 lbs/ac or 5.6 – 9.2 % range) for **2,800 gal/ac injected** with 55 lbs/ac fertilizer N

Ammonia Loss (using dosimeter tubes) from Liquid Beef Manure applied into standing corn - Jun 17-24 2024

Average of all Treatments

	June 17	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
High Temp (°C)	**30**	31	39	33	27	22	27	24
Low Temp (°C)	15	15	20	21	22	16	17	15
Windspeed (km/hr)	32	11	21	18	10	3	47	32
Rainfall (mm)	3	0	13	0	0	6	39	17



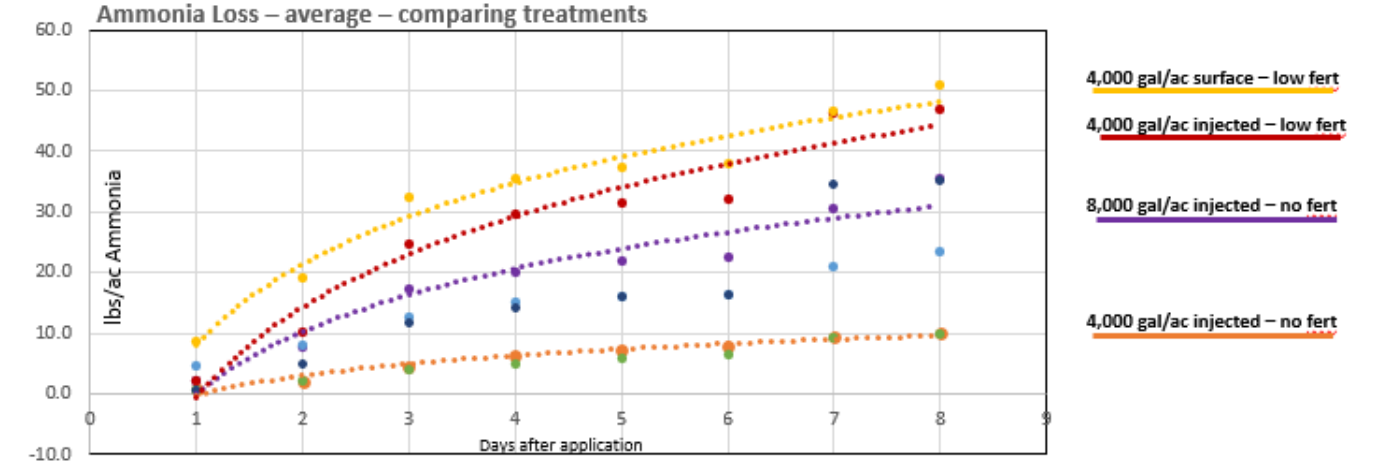
Ammonia loss – up to 2/3 of the ammonia-N (canopy cover reduces loss)

- Higher the pH the higher to Ammonia loss
- Sunny, warm, windy conditions = higher ammonia loss
- Highest in the 1st 24 hours – "pooled" areas

Rainfall after surface application reduces ammonia loss. (thunderstorms increase loss)

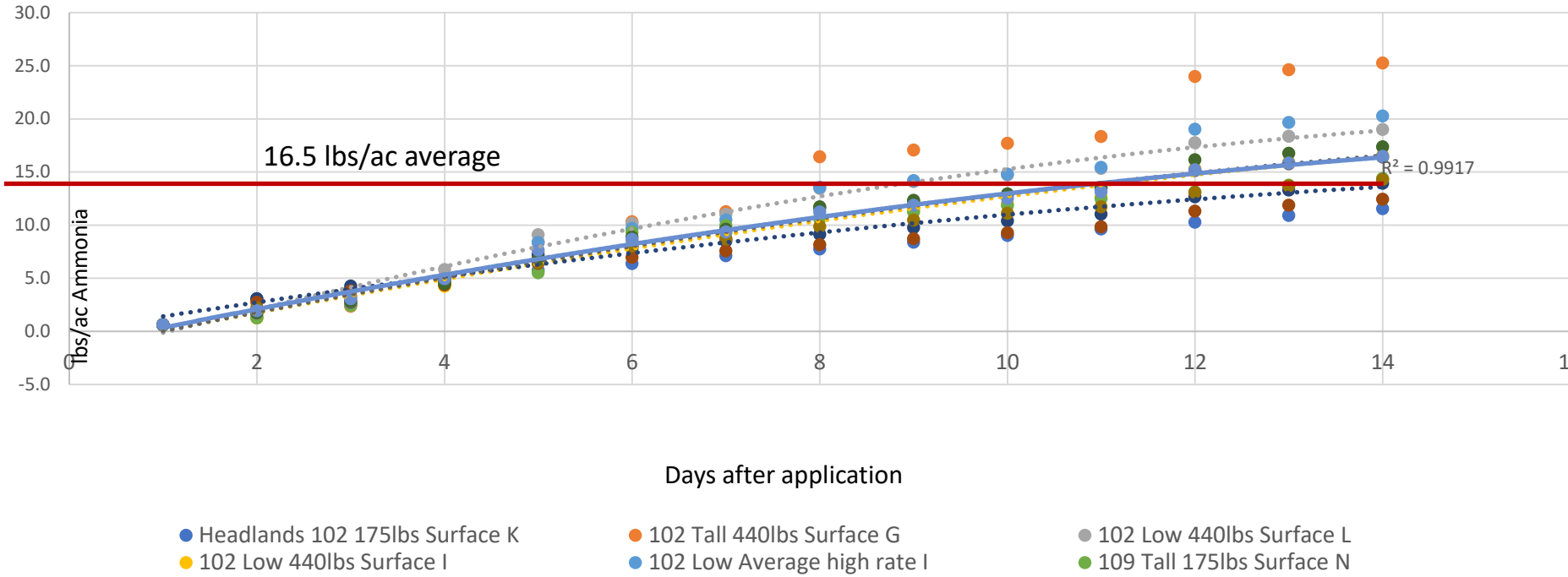
Injection reduces loss but higher rate will have higher losses (8,000 gal vs 4,000 gal)

Fertilizer applied ahead of application will increase ammonia loss (higher soil N/disturbance?)



Ammonia loss (July 3-16, 2024) (tubes low in canopy) from Surface applied Urea into standing corn

	Jul 3	Jul 4	Jul 5	Jul 6	Jul 7	Jul 8	Jul 9	Jul 10	Jul 11	Jul 12	Jul 13	Jul 14	Jul 15	Jul 16
High Temp (°C)	29	30	29	28	28	29	29	22	28	28	27	25	25	27
Low Temp (°C)	17	19	20	18	17	17	19	18	10	16	15	13	13	11
Windspeed (km/hr)	6	24	10	26	19	14	8	24	11	8	13	16	16	10
Rainfall (mm)	1.5	0.3	0	12.2	0	0	0	32.3	0	2.3	29.7	0.5	0	0



Observations: Side-dress Urea applied into standing corn July 3 2024

- **Average of all treatments – 16.2 lbs/ac total ammonia loss** (range 11 lbs to 25.3 lbs/ac N loss)

- Ammonia loss from urea:
  - ~20.3 lbs/ac (11 %) average (16.6 – 25.3 lbs/ac range) where 440 lbs urea was side-dressed
  - ~14.3 lbs/ac (19%) average (12.4 – 16.4 lbs/ac range) where 175 lbs was side-dressed
  - ~16.5 lbs/ac average - dosimeter tubes placed low in the canopy (range 13.9–19 lbs/ac)
  - ~17.4 lbs/ac average - dosimeter tubes placed higher in the canopy (range 12.4–25.3 lbs/ac)

- Placement of dosimeter tubes in the canopy:
  - 175 lbs/ac fertilizer N - lower losses than 440 lbs/ac fertilizer N (higher N loss but lower % of total N applied).
- Windspeed on day 6-7 seemed to increase loss compared to previous days
- Impact of rainfall? High rainfall (thunderstorms) day 8 and 11.

THANKS

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