Notes on Nitrogen in Corn

Exeter Ag Breakfast Meeting - April 15 2014

1. Ontario N Calculator gives good recommendations based on key factors that describe the field. It provides and average “best” recommendation but can’t account for weather, mineralization or N loss other than what traditionally occurs based on soil type.
2. Split applications generally have slightly lower total N recommendations to obtain the same yield compared to all-at-planting-time applications.
3. Split applications have provided greater profitability compared to pre-plant applications in trials over the last three years; but the gains are modest ($3-$9/acre). This occurs when we applied the same amount of total N in both approaches.
4. More significant profitability increases may occur if other indicators are used to adjust the “sidedress” portion of N applied. These could be total rainfall, soil nitrate test, plant colour, etc.
5. There is some indication that a threshold of 36 PPM in a PSNT on ground that has already received pre-plant broadcast N can be used as a threshold to decide if more N is required at sidedress time (i.e. if a soil already is above 36 ppm on June 10 the recommendation may be to limit sidedress N applications, if it does not reach 36 then sidedress N should be applied at recommended rates). This concept is still being verified in Ontario trials.
6. Application techniques (banded, streamer nozzle, flat fan) did not appear to change N volatilization risk from surface applied UAN. Agrotain could reduce N volatilization particularly if the soil was damp on the surface when the UAN was applied.
7. Recent research has shown a slight increase in the amount of N taken up by modern hybrids, post-flowering, when compared to older hybrids. The average, from a series of trials was 37% of the total N was taken up by the corn crop after silk emergence.
8. Interest in “late” applications of N by high clearance equipment to boost yields is significant. Waist high applications may be a safer place to start (compared to shoulder high or beyond) to reduce the risk that surface applied N may not get into the soil matrix if rainfall is absent post application.
9. Questions? greg.stewart1@ontario.ca

Results:

Version 3.011810 April 16, 2014

Review of Inputs:

Field Name:	Exeter
Region:	Western Ontario
Soil Type:	Loam
Expected Yield:	190 bu/ac
Heat Units:	3,000 CHU-M1s
Previous Crop:	Cereals (Straw Removed)
Expected Corn Price:	$ 4.85 /bu
Fertilizer Type:	UAN (28-0-0)
Fertilizer Price:	$ 400.00 /tonne
Nitrogen Price:	$ 0.65 /lb
Starter Nitrogen:	4 lb/ac
Manure Credit:	100 lb/ac

	Imperial lb/ac	Metric kg/ha
Base Nitrogen Requirement:	28	32
Yield Adjustment:	146	164
Heat Unit Adjustment:	7	8
Previous Crop Adjustment:	- 11	- 12
Price Ratio Adjustment:	- 15	-17
Total N Recommendation:	155	175
Starter N Deduction:	- 4	- 4
Manure Credit Deduction:	- 100	- 112
Preplant Recommendation:	51	58
Sidedress Recommendation:	41	47

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Starter, 150 lbs N Pre-plant

VERSUS

Starter, 100 lbs N Pre-plant plus 50 lbs Sidedress

Year	Sites	Starter N (average)	Yield Increase Bu/acre	Profit Increase (for 150 Pre-plant) $/acre	% Wins
2011	5	25	0.3	$ - 8.77	20
2012	6	19	1.6	$ -2.90	50
2013	6	11	1.3	$ -4.28	50

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PSNT Threshold = 36 PPM

# Experimental Field Sites	**17**
# Correct Decisions:	**14**
# Correct Decisions That Needed More N:	**9**
# Correct Decision That Needed No N:	**5**
# Incorrect Decisions:	**3**
% Wins	**82%**
Average UAN Application Date:	**May 10**
Average PSNT Sampling Date:	**June 15**
Average Days Between Application and PSNT Sample:	**36**

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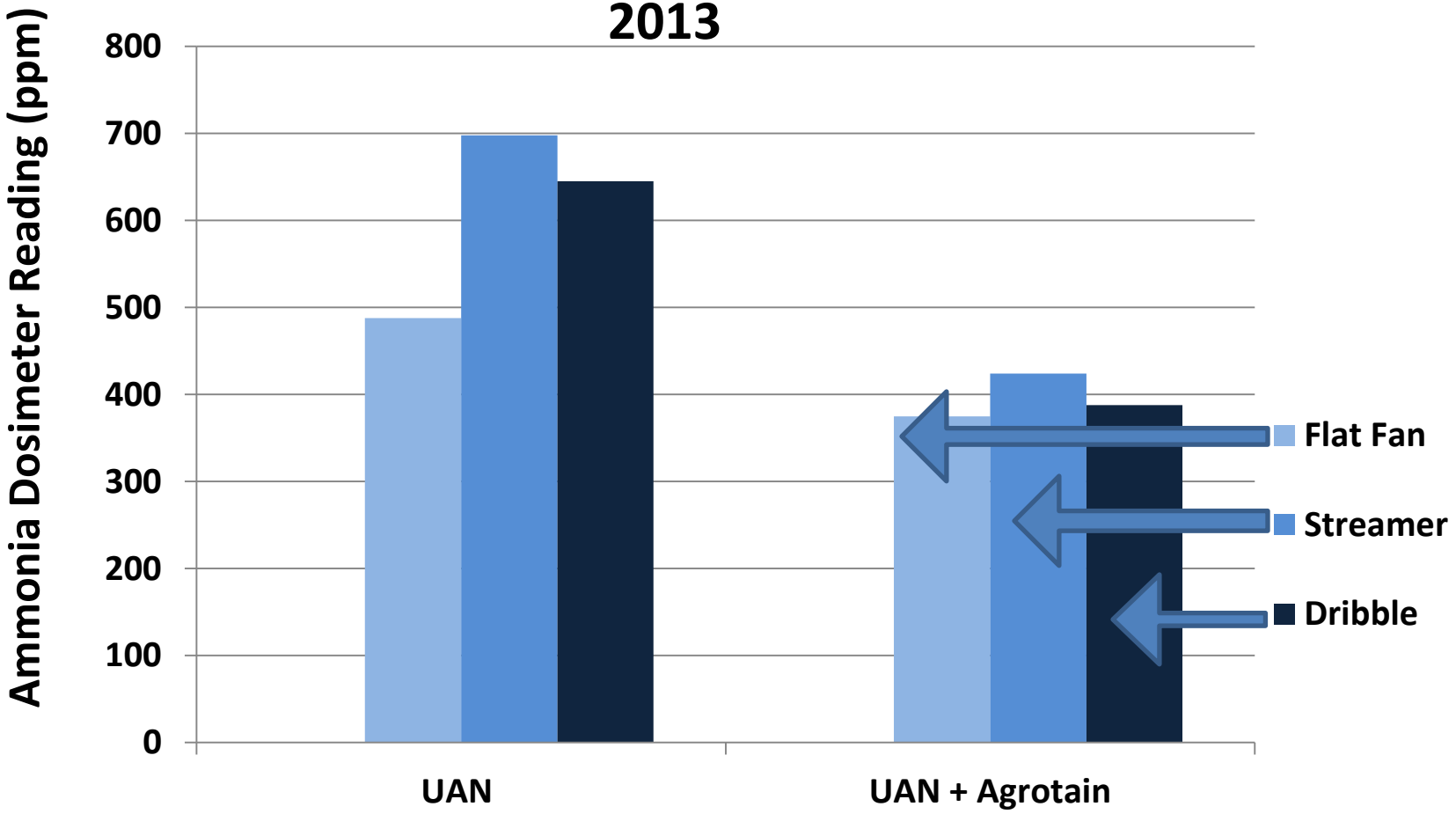
Ammonia Loss 3 Weeks After Application for 3 UAN Surface Applications With and Without Agrotain

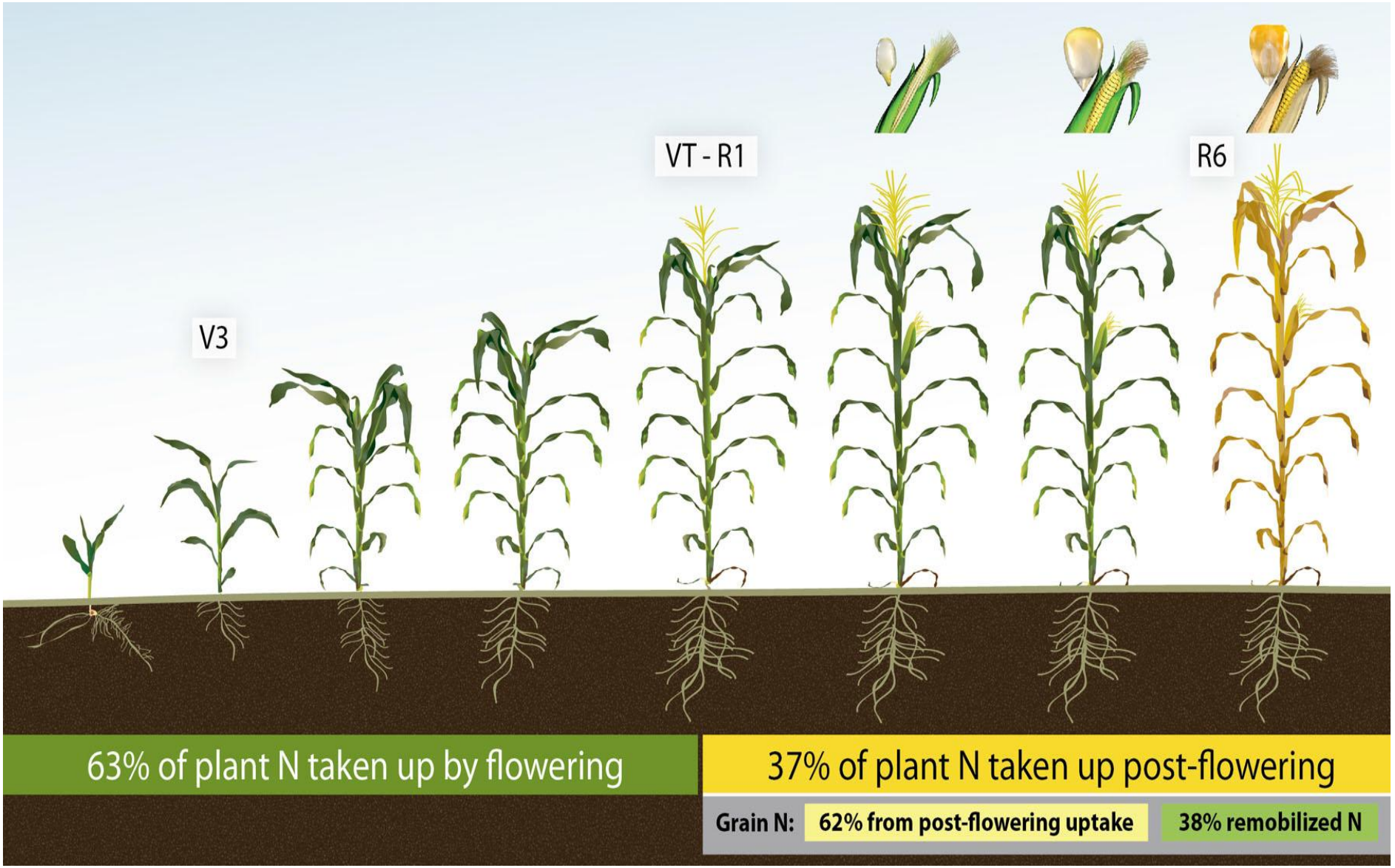
2013



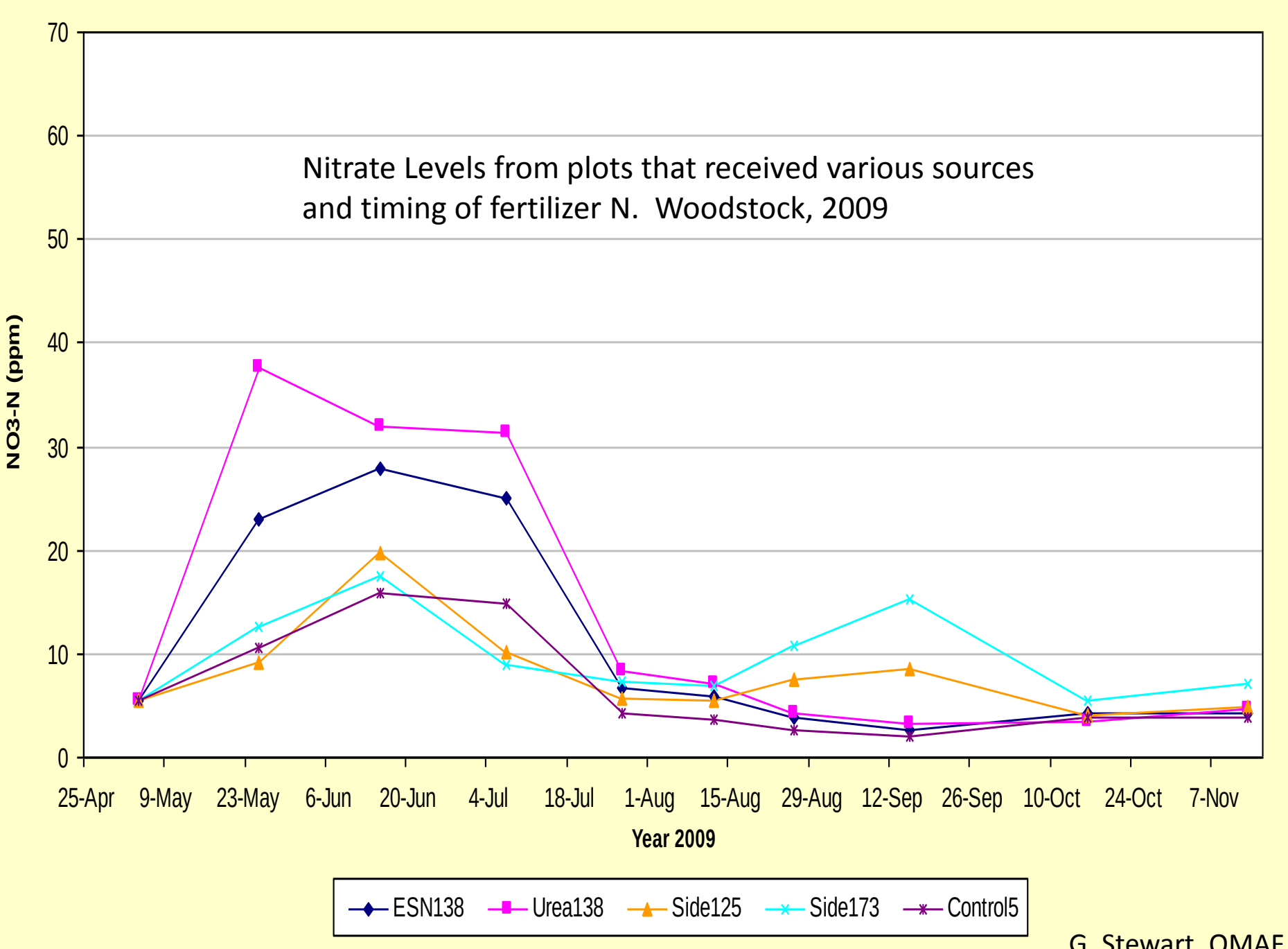
Application Date: **June 26**

8 Day Pre-application Rainfall: **40 mm**

I. McDonald, G. Stewart, OMAF



Source: Pioneer Crop Insights #4, 2014



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