

Corn Fertility Strategies

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School, Eastern Edition

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Factors in determining fertility requirements

- Soil Fertility
- Grain or Silage
- Yield expectations
- Previous Crop
- Nitrogen source



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Soil Fertility

- Soil Testing – recommended every 3 years
- Test should include pH, OM, P, K, and Z
- Soil Test Ranges – P – 18 to 23 ppm
 - K – 125 to 185 ppm
 - Z – 1.2 to 3 ppm
- For every increase in ppm for P you need 20lbs of Phosphorous
- For every increase in ppm for K you need 8 lbs of Potash



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- Every field is different. One program does not fit all
- You cannot build your levels over 1 year. Need to make a plan on deficient fields
- What is Soil Test Drawdown?
- Drawdown is the previous year crop using more nutrients than what was planned for
- Drawdown had been forgotten or disregarded for years when planning fertility requirements
- Ensure you take previous crop yields into account when building your fertility plan



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Crop Removal Chart

Crop	P2O5 (lbs)		K2O (lbs)	
	Tonne	Bushel	Tonne	Bushel
<i>Grain Corn</i>	15.7	0.4	10.2	0.26
<i>Silage Corn</i>	11	NA	23	NA
<i>Soybeans</i>	33.9	0.86	55.1	1.4
<i>Potato</i>	3.6	NA	15	NA
<i>Oats</i>	10.3	0.26	39.4	1
<i>Barley</i>	15	0.38	13.4	0.34
<i>Winter Wheat</i>	21.8	0.6	14.2	0.36
<i>Winter Rye</i>	16.5	0.42	15.7	0.4

Calculation example: 190 bus/acre or 4.8 mt/ac Grain Corn

P2O5 – 4.8 mt X 15.7 lbs = 75.4 lbs removal

K2O – 4.8 mt X 10.2 lbs = 48.9 lbs removal



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Effects of Phosphorous on Corn

- Phosphorous is essential for the health and vigour in corn
- Stimulates root growth
- Increase stalk strength
- Improved seed production
- Helps fight plant diseases
- Very important in crop development



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Phosphorous Deficiency



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P Banding vs. Broadcast (1970-2010)

	Banded 55 lb-P/ac	Broadcast 55 lb-P/ac	Broadcast 115 lb-P/ac
Average Rate (lb-P/ac)			
Average Yield Increase (bu/ac)	10	4	2
Net Profit (\$/ac)	14	-14	-54
Soil-test P (ppm)	15	17	16
Soil-test K (ppm)	125	135	132
Sites	40	60	37

Corn Price: \$4.50/bu; P Cost: \$0.55/lb P



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Elora Fertilizer Trials

Soil Test P = 8 PPM; Soil Test K= 68 PPM

Broadcast 11-52-0 @ 200lb/ac; Sidedress UAN 150 lbs N/acre

	Yield
Starter Fertilizer	11-52-0
Control	110
UAN @ 10 gal/ac 2X2	112
10-34-0 @ 5 gal/ac IF	113
6-24-6 @ 5 gal/ac IF	154
2-20-18 @ 5 gal/ac IF	171
MAP @ 75 lb/ac 2X2	128
Split MAP @ 25 lb/ac IF + 50 lb/ac 2X2	114
MAP @ 75 lb/ac 2X2 + UAN @ 10 gal/ac 2X2	126
7-34-19 @ 75 lb/ac 2X2	171
Split 7-34-19 @ 25 lb/ac IF + 50 lb/ac 2X2	179
7-34-19 @ 75 lb/ac 2X2 + UAN @ 10 gal/ac 2X2	168
5-20-20 @ 200 lb/ac 2X2	203
6-24-6 @ 5 gal/ac IF + 5-20-20 @ 200 lb/ac 2X2 + UAN @ 10 gal/ac 2X2	190
Average:	160



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Effects of Potash on Corn

- Increase Root Growth leading to better drought tolerance
- Improves stalk quality
- Increases grain quality and test weight
- Helps prevent plant disease through better plant health



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Potash Deficiencies



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Soil Test Status in Ontario

Most recent IPNI survey indicated
that 20% of soils samples tested
below 80 PPM



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7 Site-years of data

All sites broadcast with 0-0-60 @ 200 lb/ac

Average Soil Test K: 65 ppm

Starter Fertilizer		
Control	6-24-6	5-20-20
----- <i>yield (bu/ac)</i> -----		
174	178	187



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Nitrogen

- Most important nutrient in corn production
- Many N sources available to producers
- Rule of thumb is 0.8 lb/bus or 31.5 lbs/tonne
- Timing is the challenge
- Source used will be dependant on timing, availability and equipment



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Nitrogen Sources

- Ammonium Sulfate – 21% N & 24% S
- Ammonium Nitrate – 33.5% N
- Urea – 46% N
- Anhydrous Ammonia – 82% N
- Liquid 28% UAN – 28% N
- Liquid 32% UAN – 32% N
- Calcium Ammonia Nitrate 21-27% N & 8% Ca
- ESN – Environmentally Friendly Nitrogen – 44% N



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Nitrogen Timing

- Corn success is very dependant on Nitrogen
- Timing has been a topic of discussion for years
- Many studies by many agronomist
- Factors deterring in furrow or late N Application
 - equipment or lack of
 - product availability



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Illinois Results from 2015

<u>Treatment</u>	<u>UR-15</u>	<u>MN-15</u>	<u>DK-15</u>	<u>Avg</u>
PT UAN 150 injected	228	217	204	216
PT Urea/AT 150 broadcast	237	223	200	220
PT NH3 150 injected	219	213	201	211
*PT UAN/Instinct 150 broadcast	229	225	183	213
*PT UAN 100 inj + V9 UAN 50 drbl row	233	223	198	218
*PT UAN 100 inj + VT UAN 50 row mid	241	215	179	212
*PT UAN 100 inj + VT UAN 50 drbl in row	238	228	184	217
*New in 2015				

VT applications performed well, but not clearly better than some other treatments in a “high-loss” year



Impact of N timing at Drumbo site, 2019.

100 lbs of N applied at planting:

0,40 and 80 lbs applied on June 25; 0,40 and 80 lbs N applied on July 23.

80 lbs N applied June 25.

80 lbs N applied July 23.

Photos taken Aug 7, 2019



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What to do after 9 inches of rain in June?



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Nitrogen Management

Millbank Site

Hybrid	Over the Tile		Between the Tiles	
	No Additional N	Plus 50 lbs/acre N	No Additional N	Plus 50 lbs/acre N
MZ3515DBR	174	194	138	172
MZ3066DBR	185	205	126	191
MZ2810DBR	194	206	166	191
Average	184	202	143	184

Source: G. Stewart, Maizex Seeds



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Conclusion

- Ensure enough nutrients available to cover yield expectations
- Remember to compensate for previous crop drawdown
- Chose the best Nitrogen Product and timing to achieve maximum yields
- Late Nitrogen is recommended for maintenance only
- SOIL TEST!!!



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Thank You !!

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