



Precision Agriculture Systems

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Sustainability



What are the 4Rs



RIGHT SOURCE

Matches fertilizer type to crop needs.



RIGHT RATE

Matches amount of fertilizer type crop needs.



RIGHT TIME

Makes nutrients available when crops needs them.



RIGHT PLACE

Keep nutrients where crops can use them.



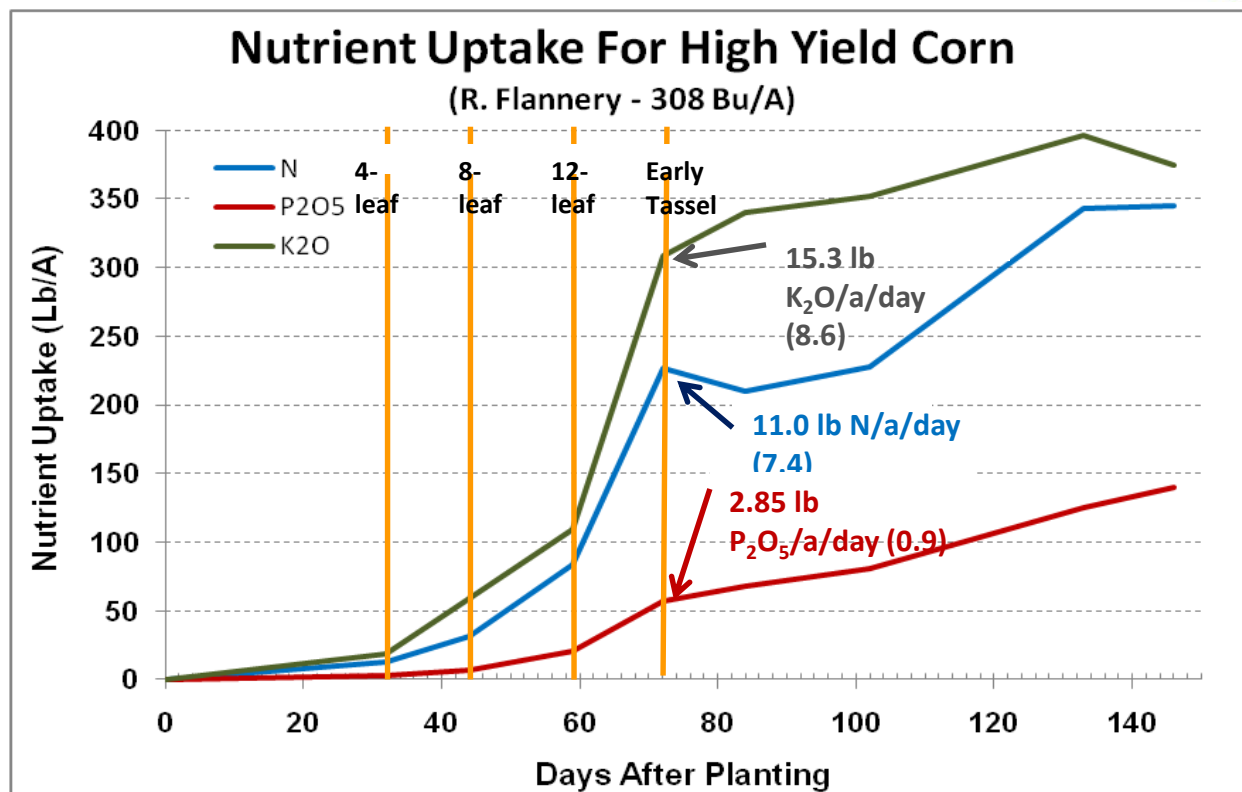
Sustainability



- 4Rs of nutrient management
 - Nutrient Protection
 - Nutrient stabilizers
 - Exploiting microorganisms
 - Nutrient Delivery
 - Safe products
 - Products safe for tissue application
 - VRT delivery systems
 - Prescription delivery of nutrients
 - Data
 - GPS sampling
 - Soil type and yield zone
 - Evidence based recommendations
 - Test plots



Nutrient Uptake: lbs/acre/day



- Possibly the biggest change in the Tri-State Fertilizer Recommendations
- Timing is Everything
- Needs to be Exploited



Nutrient Timing



- Current corn hybrids use nitrogen later in the season

Era of Corn Hybrids and Time of N Uptake				
Era Of Hybrid Release	N at R1	N at R6	Post-flowering N Uptake	Increase in post-flowering N Uptake
	- - - - - lbs N/A - - - - -			%
Old (1940 to 1990) ^a	102	145	43	28%
New (1991 to 2011) ^a	97	152	55	
Old (1970) ^b	125	162	37	40%
New (2000) ^b	125	177	52	

^a Ciampitti and Vyn, 2012 ^b Haegele et al., 2013

Dr. Ciampitti - Kansas State University, Dr. Tony Vyn – Purdue University
Jason Haegele – University of Illinois



Nutrient Timing



Effect Of Late UAN Application On Corn Yield

Dupont/Pioneer, 2010

All N Applied Before Tassel <i>19 Plots</i>	Portion Of N Applied At Brown Silk <i>21 plots</i>
Avg Yield 217 bu/acre	Avg Yield 248 bu/acre
Low yield: 170 bu/acre High yield: 269 bu/acre	Low yield: 183 bu/acre High yield: 302 bu/acre
3 plots over 240+ bu/acre	14 plots over 240+ bu/acre



Presented by Dr. Dale Leikam, Leikam AgroMax



Nutrient Timing



- Bio-stimulants
 - Humic Acid
 - Fulvic Acid
 - Microorganisms
- Low-salt starter
 - Custom Liquid Blends
 - Low Salt, High Quality
 - Unique Placement Can Lower Use Rate
- Foliar fertilizer
 - Custom Prescription
 - VRT application





VERTEX[®]



Vertex



- Soil sampling
- VRT dry/lime application
- Custom starter blends
- VRT nitrogen
- Prescription post products
- Yield maps
- Stalk degradation



Soil Samples



- Control the information
 - Junk in, junk out
- Combine similar soils
 - Cation exchange capacity (CEC), organic matter
- Stay consistent on your formula
 - Tri-State Nutrient Recommendations
- Find a reliable program
 - SST, SSI, ...



VRT Application



- 4Rs of Nutrient Stewardship
 - Applying the **Right Product**
 - At the **Right Rate**
 - At the **Right Place**
 - At the **Right Time**



Custom Starter Blends



- Individual needs
 - NPK
 - Micronutrients
 - Microorganisms
 - Bio-stimulants
 - Branded names



VRT Nitrogen



- Organic matter
- CEC
- VRT MAP/DAP
- Irrigation
- Yield potential
- 4R concerns



Prescription Post Products



- Tissue testing
- **Pre Sidedress Nitrate Tests (PSNT)**
- Large portfolio of specialty products
- Don't have it? Make it!



Yield Maps



- Finding trends
- Develop fertility equations
- Removal rates
- Finding problem areas



Residue Management



- Stalk degradation
 - Fall into food
 - Easier on equipment
 - Consistent planting area



**DO YOUR
SPRING CLEANING
THIS FALL**

RESIDUE MANAGEMENT | THE SITUATION. THE PROBLEM. THE SOLUTION.

THE SITUATION
Did you know that approximately 50 pounds of residue are produced for each bushel of corn harvested? This means a 200 bushel corn crop produces 4.73 tons of residue. All of this residue ties up valuable nutrients in the soil.

4.73 tons of residue contains:
75 pounds of Nitrogen = \$31 (28%)
26 pounds of Phosphorus = \$14 (MAP)
124 pounds of Potash = \$37 (Potash)

Costs per lb. of NPK based on eastern corn belt retail prices Sept 2018.
Source: HarvestThePotential.com

Applying a residue treatment within two weeks after corn harvest has regularly shown a 4-5 bushel increase in soybean yield the following year.

THE PROBLEM
If conditions are not suitable for decomposition, heavy residue will tie up nutrients and host pathogens for overwintering.



Host
If you remove a piece of the disease triangle, a disease cannot occur.

DISEASE

Pathogen **Environment**

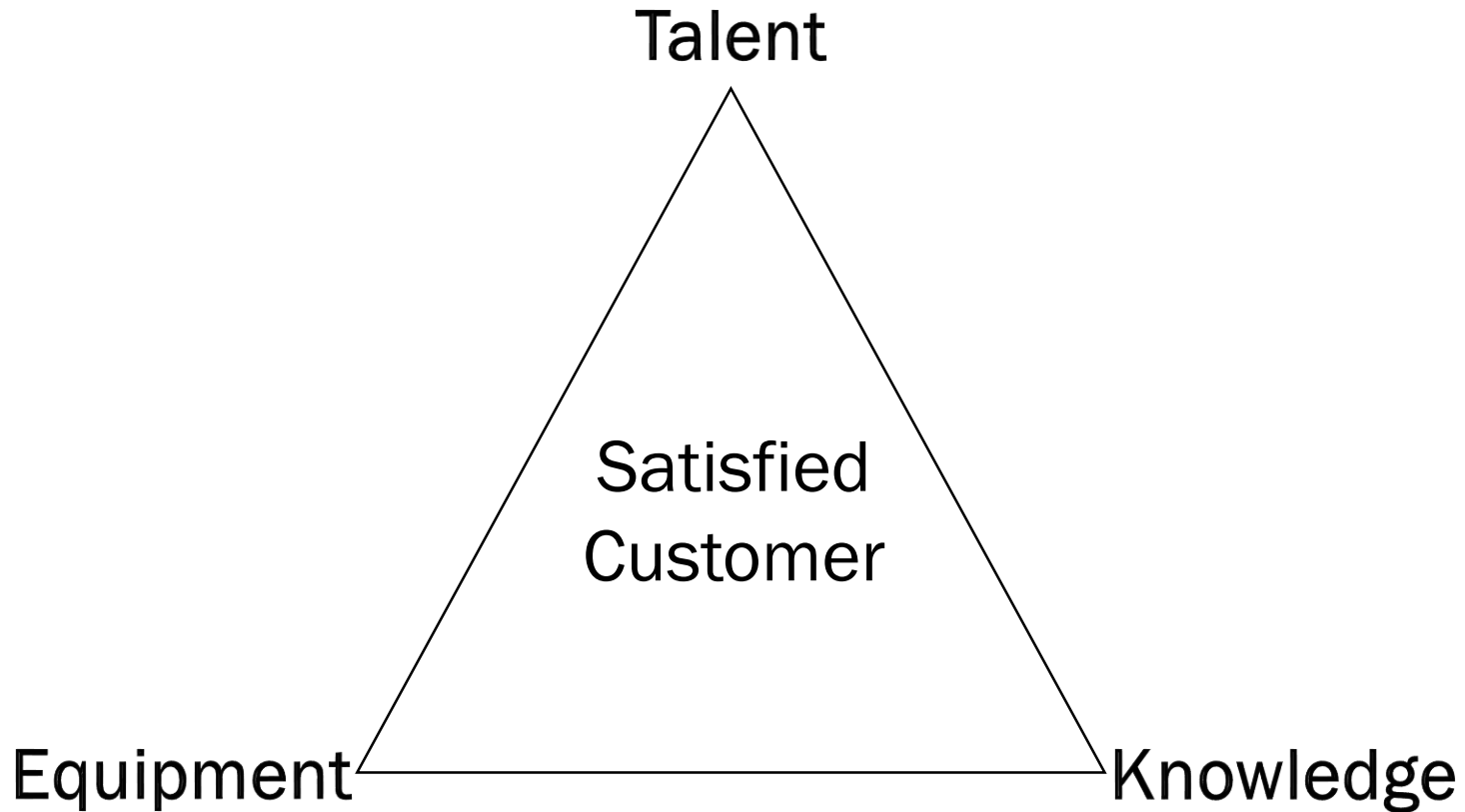
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4 nutrient stewardship



Precision Ag Triangle



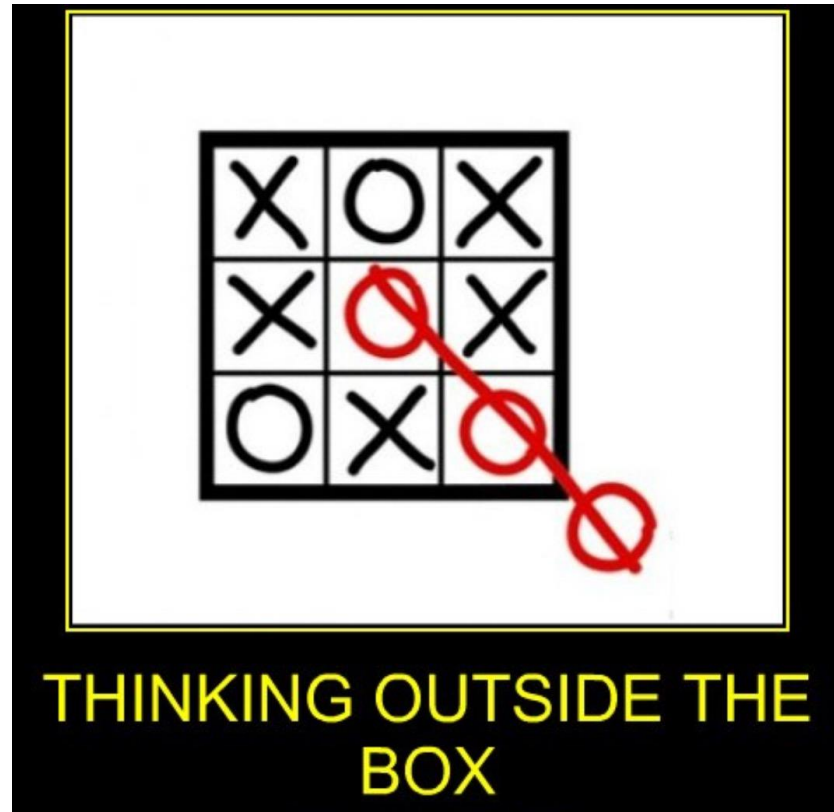
New Thoughts



- “Systems approach”
 - Everything works together
- Be open to new ideas/products
 - Think for yourself – interpret data
 - Find multiple sources
- “Recalibrate thinking”
 - Rapid change



Final Thoughts





Questions?

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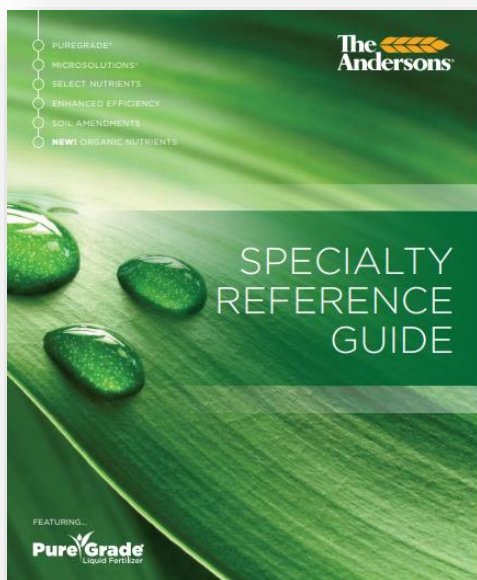
david_dyson@andersonsinc.com



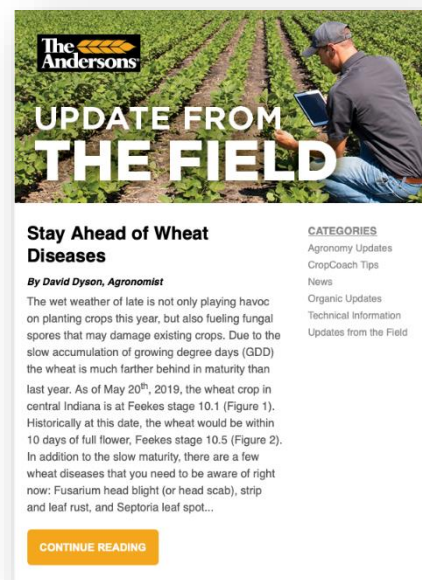
Additional Resources



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