

Reducing Fertilizer Costs while Maintaining Yield

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Phosphorus (P) & Potassium (K)

- 1) Key Issue with P & K management is to know what your soil test levels currently are!!
- 2) Applying P or K when soil test levels are very high or excessive will seldom give positive return
- 3) Applying P or K when soil test levels are low will often give a positive return
- 4) In between these two areas, you have to weigh the cost of application vs. the risk of lost crop production

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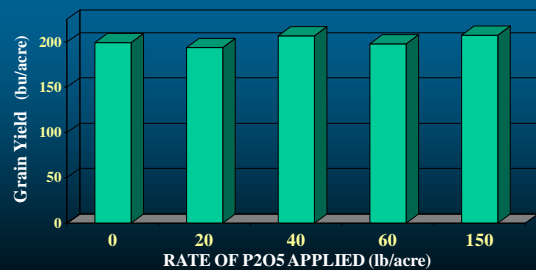
Interpretation

Soil Test P Level (ppm)	Rating	Fertilizer Response
0-12	Very Low	Almost Definite
13-22	Low	Highly Likely
23-35	Medium	Probable
36-69	Optimum	Not Likely
> 69	Very High	Very Rare

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Georgetown R&E Center: 2000

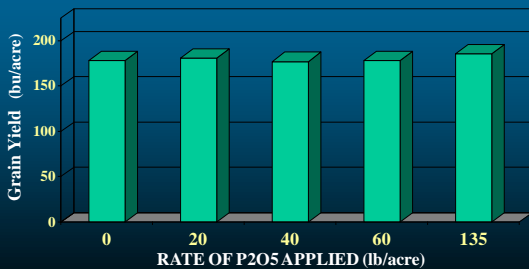
STP = 62 FIV



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Georgetown R&E Center: 2002

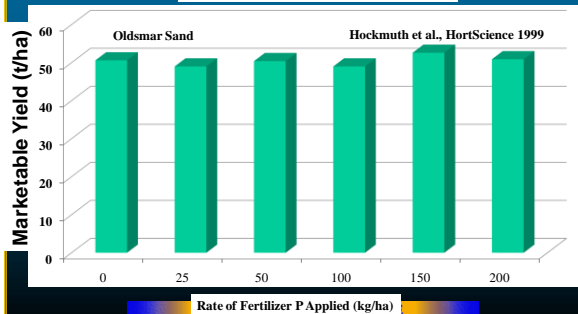
STP = 62 FIV



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Tomato Response to Fertilizer P

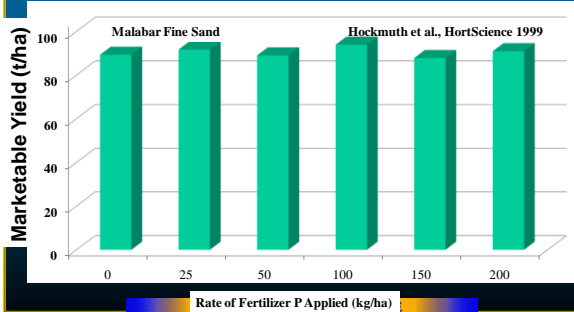
Mehlich 1 Soil Test P = 290 ppm (VERY HIGH)



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Tomato Response to Fertilizer P

Mehlich I Soil Test P = 63 ppm (Optimum or High)

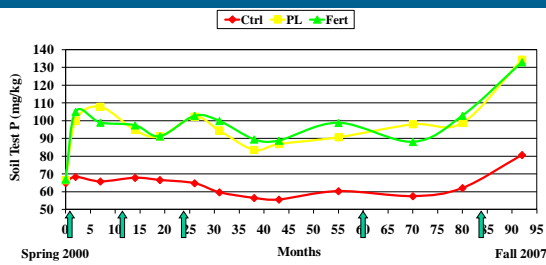


Key to Soil Testing

- 1) Greatest VALUE of soil testing is NOT the current year's soil test concentration...
- 2) Track changes over time. Use soil testing as a long-term management tool
- 3) Take soil test, perform an action (apply or don't apply), and monitor what happens
- 4) This allows for site-specific management...best way to know how much nutrient is needed
- 5) Keeping good, accurate records is important

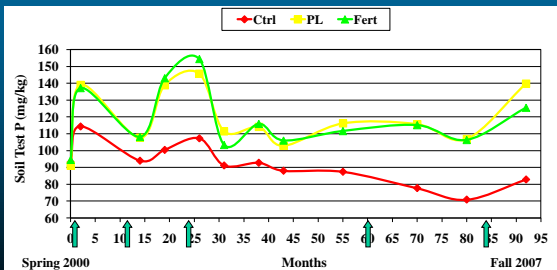
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Change in STP at GT



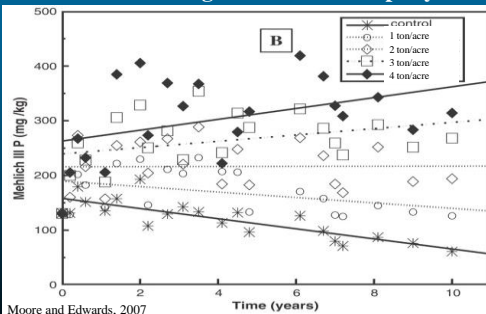
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Change in STP at CF



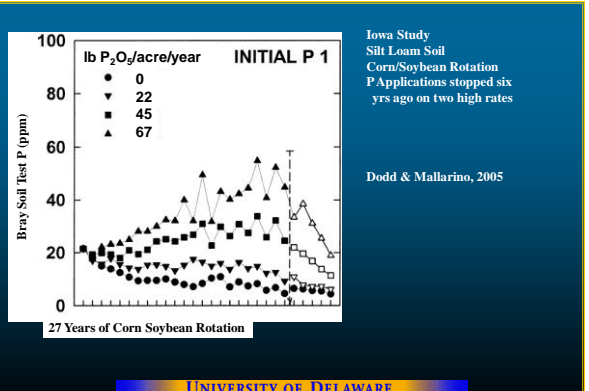
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Silt Loam Soil in Arkansas; Broiler Litter Tall Fescue Forage cut 3 to 4 times per year



Moore and Edwards, 2007

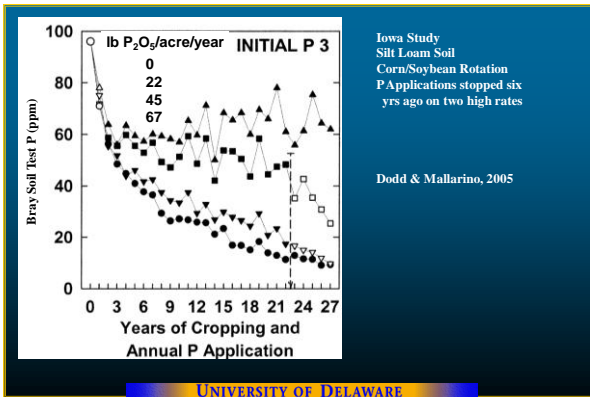
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Iowa Study
Silt Loam Soil
Corn/Soybean Rotation
P Applications stopped six
yrs ago on two high rates

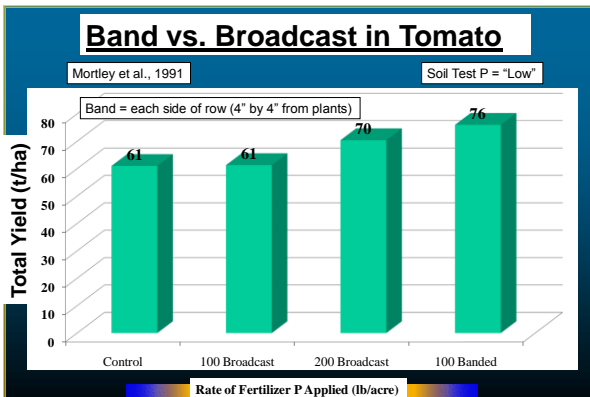
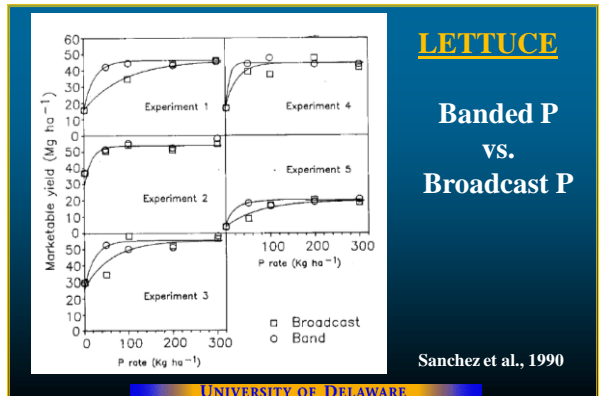
Dodd & Mallarino, 2005

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- ### Factors in Nutrient-Use Efficiency
- 1) Remember the “FOUR R’s”...
 - 2) **Right product, right rate, right time, right place**
 - 3) Product = soil testing
 - 4) **Rate = soil testing**
 - 5) Time = match application with uptake
 - 6) **Place = where the plant roots will get it**
 - 7) **Manure/compost**
 - 8) **Fertilizer Technologies/Additives**
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- ### Banding vs. Broadcasting
- 1) Phosphorus tends to be “fixed” by soils
 - 2) **Banding reduces SOIL-to-FERTILIZER contact**
 - 3) Soils extremely low in P: Use BOTH
 - 4) **Banding P = LESS fertilizer needed**
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- ### Timing
- 1) Too much/too early = greater leaching potential
 - 2) **Split applications of N increase efficiency**
 - 3) **Fertigation = improved efficiency**
 - 4) **Poor Irrigation practices can negate proper timing of N fertilizer**
 - 5) **Too much water = leaching losses**
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Fertigation improved N USE EFFICIENCY in bell pepper production.

Yield at four pre-plant/fertigation N fertilizer combinations.

Fert. application method		Total fancy pepper yield	Total marketable pepper yield
Percent N applied pre-plant	Percent N applied by fertigation		
0	100	4.2	9.1
30	70	4.4	9.5
70	30	3.8	8.3
100	0	2.9	6.6
P-value		0.0531	0.0006

Yuncong Li and Tom Obreza
University of Florida

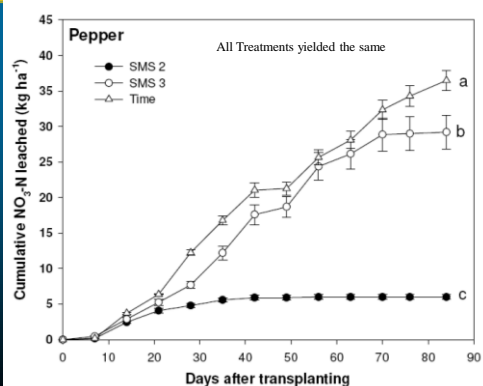
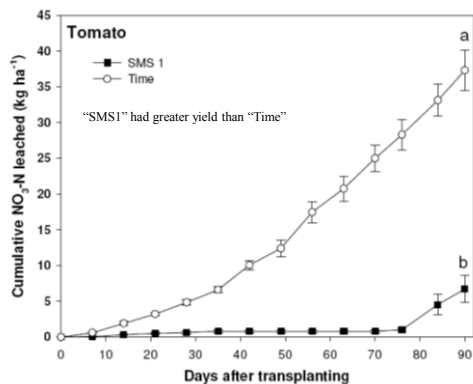
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Irrigation Mgmt vs. Nitrogen Mgmt

- 1) Compared Drip-Irrigation methodologies
- 2) "Time" = Standard Grower Practice, fixed time
- 3) "SMS1" = monitored soil moisture (tomato)
- 4) "SMS2" & "SMS3" = peppers, SM monitoring
- 5) Dukes et al., 2006

<http://irrigation.ifas.ufl.edu/drip/Dukes%20et%20al%20Irrig%20Nit%20veg%20BMPs.pdf>

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Manure as an N Source

- 1) Fertilizer costs have greatly increased value
- 2) Still difficult to know manure credit
- 3) Book values are good starting point for estimating N credits...BUT...to maximize value...
- 4) Manure credits should be fine-tuned on a site-specific basis using diagnostic tools
- 5) These tools include: PSNT, tissue tests, etc.
- 6) Many studies have shown increased yield!

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Using Fertilizer Technologies to Increase Nutrient-Use Efficiencies

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KNOW what the Product Does!!

- 1) **Stabilized Nitrogen**
- 2) **“Provides Season-Long Protection”**
- 3) **“Works in ALL Situations”**
- 4) **Be Cautious so you don’t waste money!**
- 3) **Provide DATA on “mode of action”**

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Fertilizer Technologies

- 1) **Volatilization Inhibitors**
- 2) **Nitrification Inhibitors**
- 3) **Coated Urea/Formulated Urea**
- 4) **Phosphorus = Reduces P fixation by the soil**

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Summary

- 1) **Use Soil AND tissue testing as a long-term management tools...records are important!**
- 2) **Four R's: Right...product, rate, time, place!**
- 3) **Irrigation management impacts N management**
- 4) **Manure/compost excellent nutrient sources**
- 5) **Technology/DATA??/Fits management**

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QUESTIONS???

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