Seed Placed Starter Fertilizer for Corn

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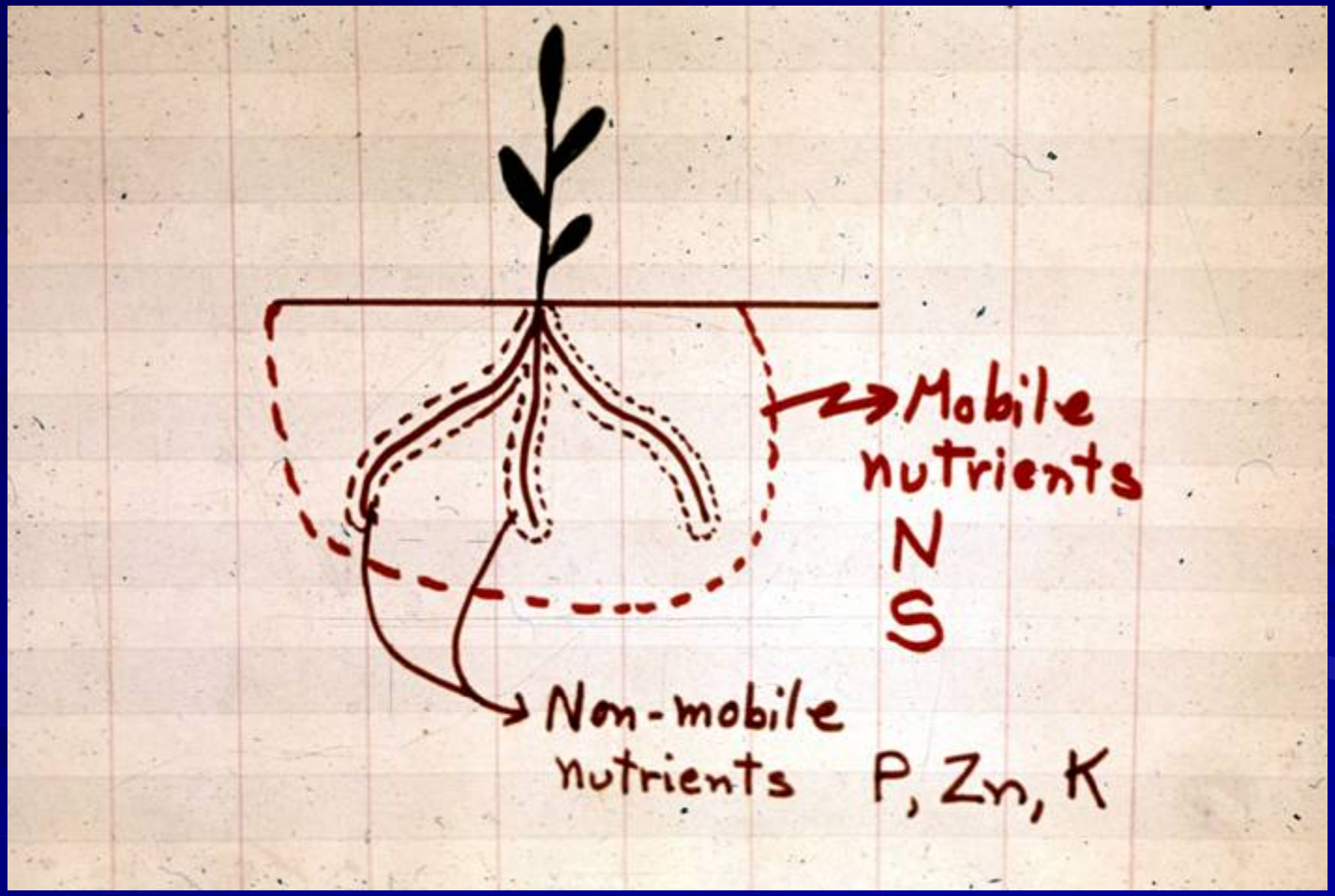
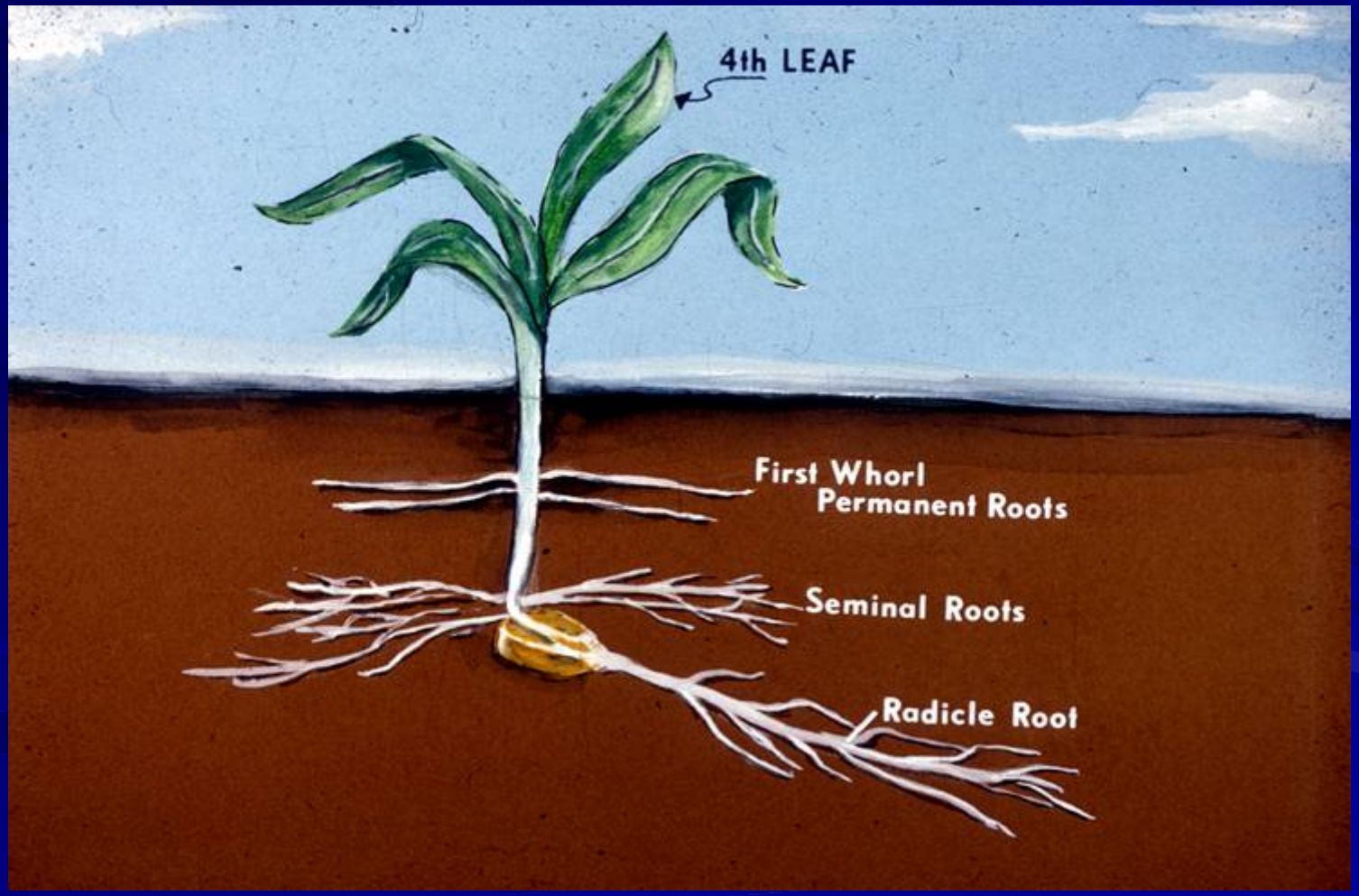
Seed Placed and Starter Fertilizer is not a New Idea


Mobile
nutrients
N
S
Non-mobile
nutrients
P, Zn, K

Roots explore soil for non-mobile nutrients



Growth: Soil volume fertilized

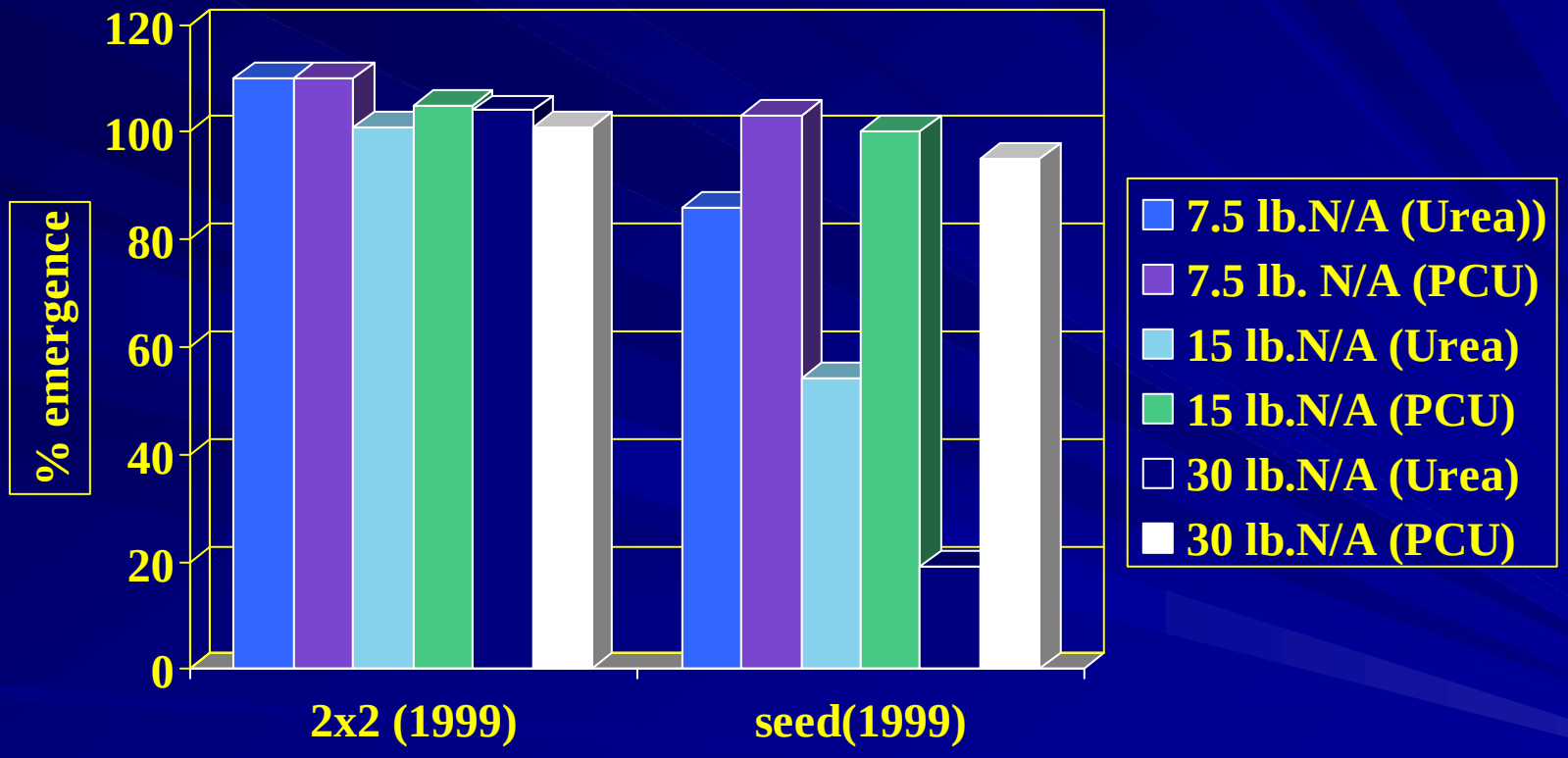
Soil volume fertilized with phosphate	Top growth	Root growth
	grams/plant	feet/plant
3 %	5.05	120.1
6 %	4.27	147.6
12 %	4.33	139.4
25 %	4.01	103.7

Soil test P = low Measurements taken 32 days after planting

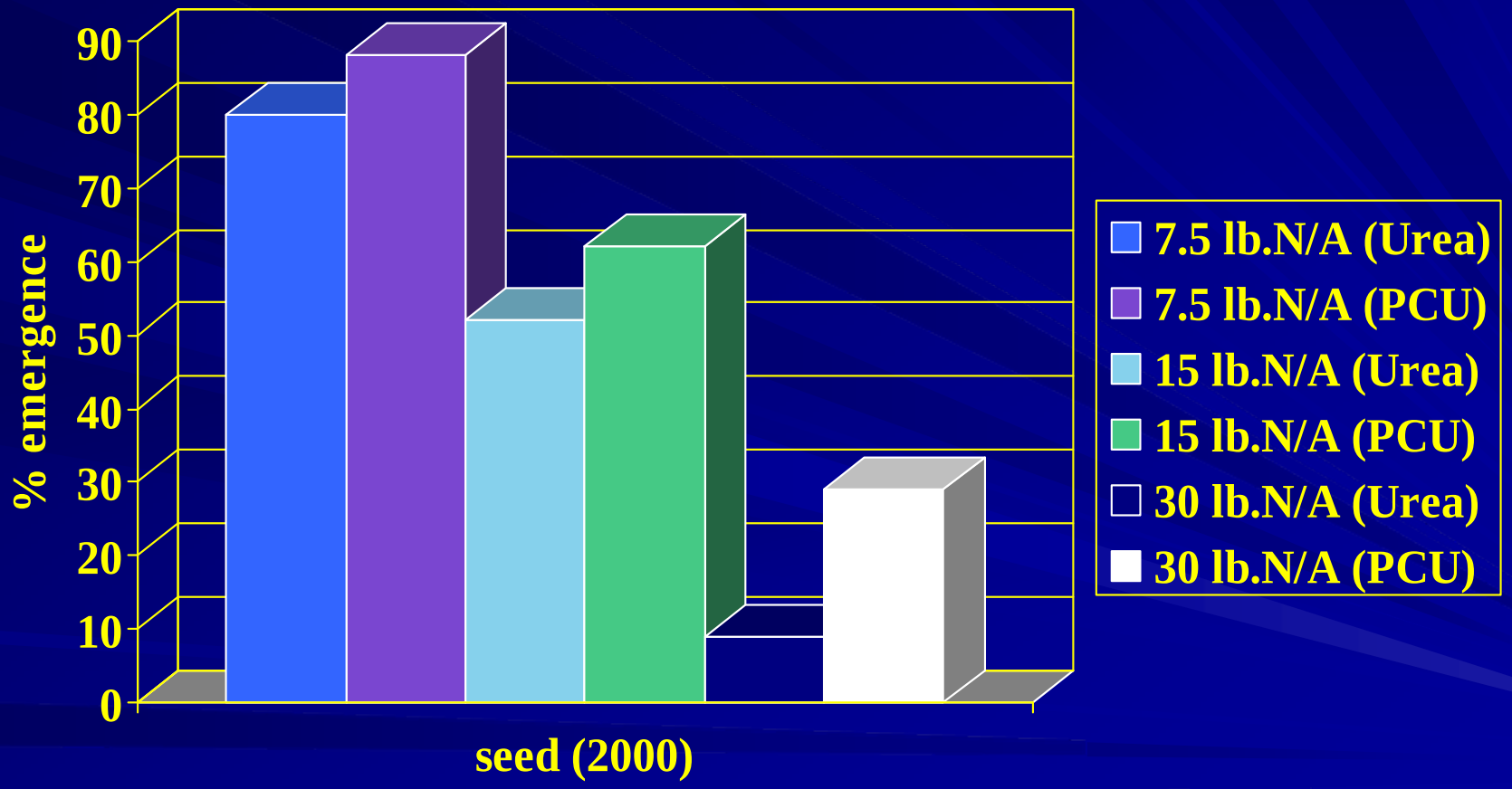
What fertilizers would we seed place?

- Urea – in a side dress system or reduce tillage situation.
- Phosphorus
- Potassium

Urea With Corn Seed:Emergence



Urea With Corn Seed:Emergence



Urea With Corn Seed:yield

N Source	Placement	N Rate (lb./A)			
		0	7.5	15	30
		---------- bu./Acre----------			
1999					
Check	none	139	-	-	-
Urea	2x2	-	166	151	161
	With Seed	-	132	84	59
PCU	2x2	-	159	160	159
	With Seed	-	153	155	150
2000					
Check	none	163	-	-	-
Urea	With Seed	-	144	126	32
PCU	With Seed	-	171	131	97

Urea

- Urea placed with seed not a good idea. Ammonium will hurt germination.
- 2X2 seems to work – some soil between fertilizer and seed.

Seed Placed 10-34-0: Corn

Rate Applied	Emergence	Early Growth	Yield
Gallon/acre	Plants/acre	Grams/6plants	Bu/acre
0	29,770	77.5	119
5	30,500	93.5	112
10	30,780	97.8	116
15	28,310	80.3	115

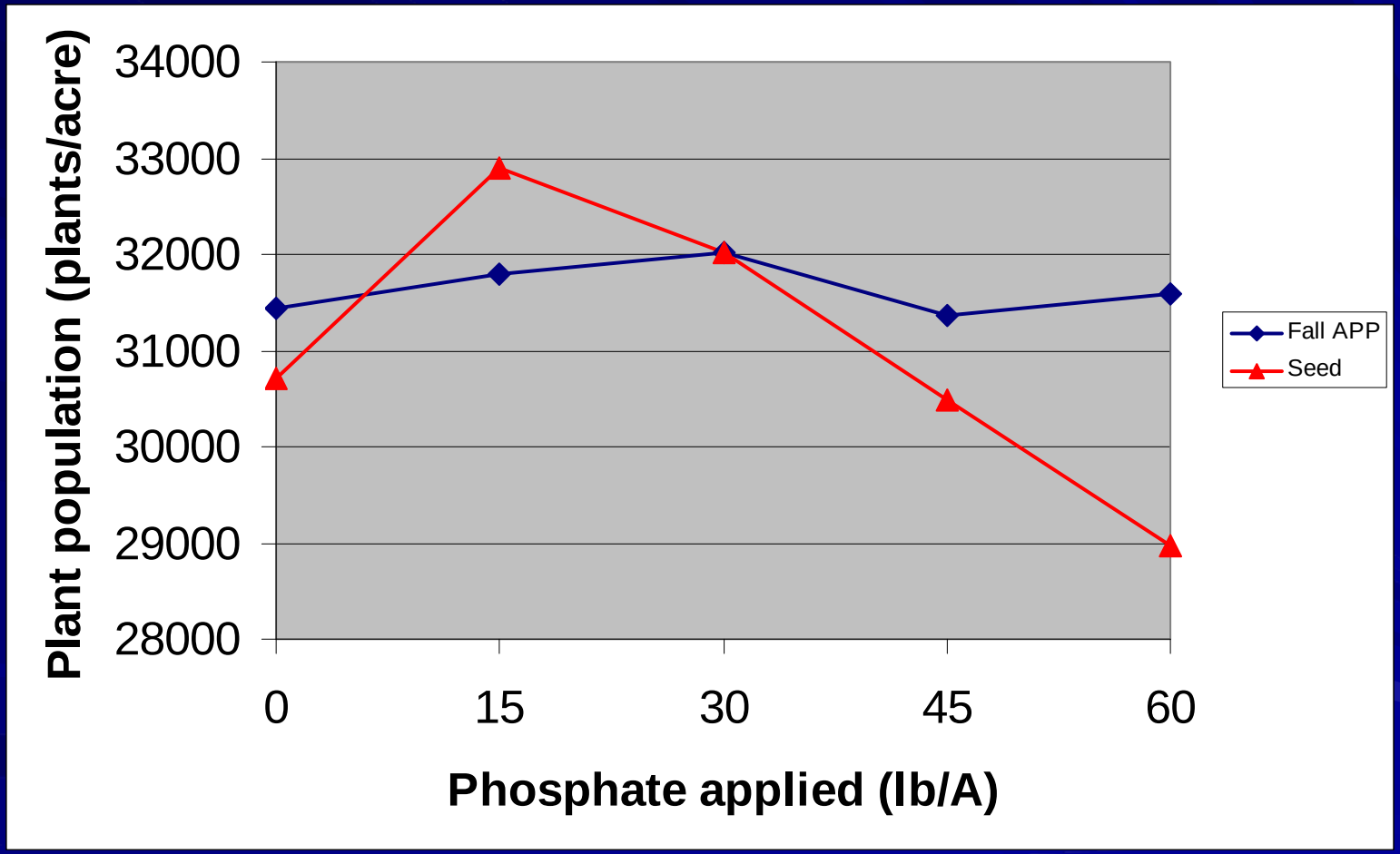
Using 10-34-0 With Corn

- No damage to germination if used at reasonable rates even in dry soils
- No negative effect on early growth of corn
- No negative effect on corn yield

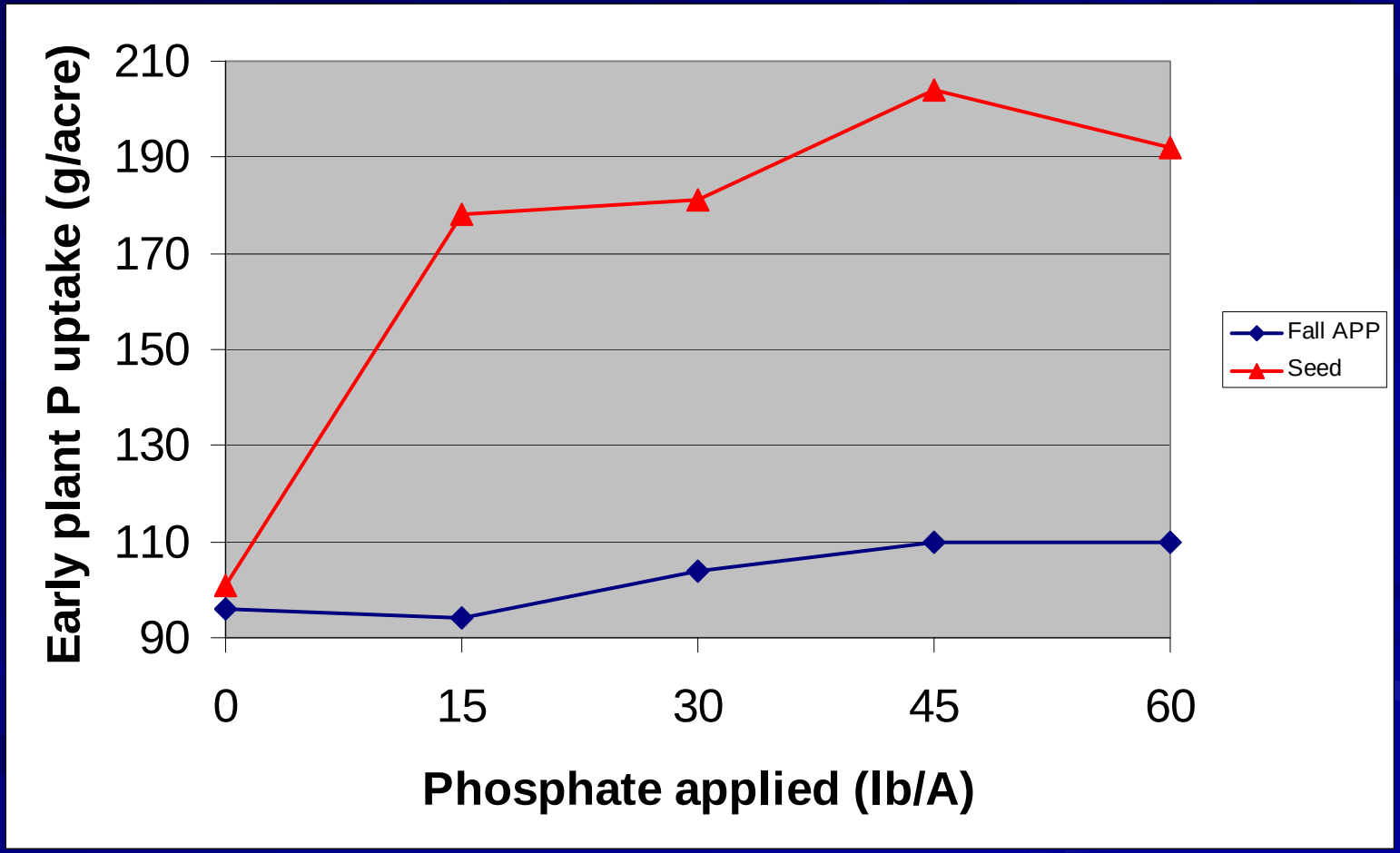
Strip-till example 2007

- Fall band and Spring seed applications in Strip-till.
- Rates 0, 15, 30, 45, and 60 lb phosphate per acre. = 0, 3.8, 7.5, 11.3, and 15 gallons 10-34-0 per acre.

Plant population - 2007

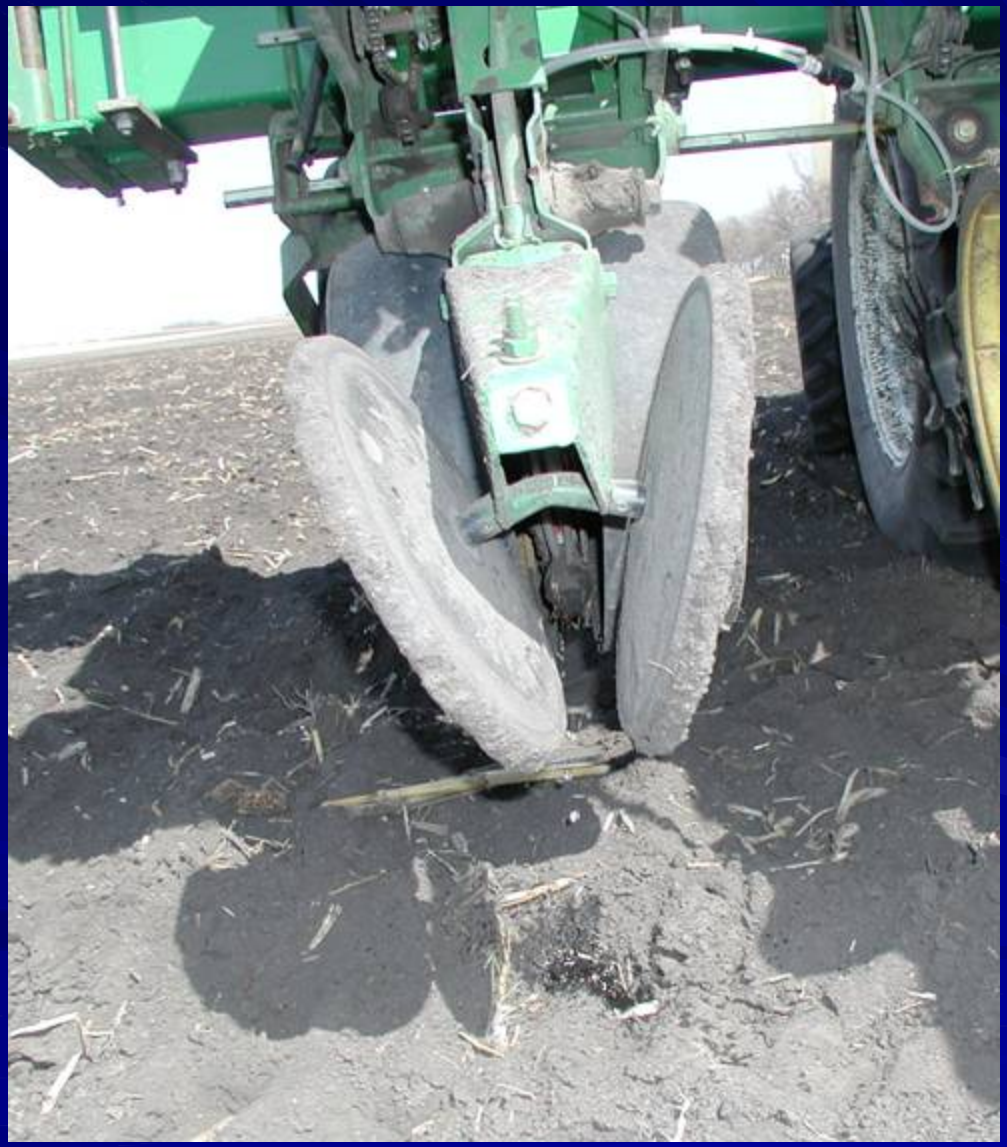


Early Plant P uptake - 2007



Does the location of the band relative to the seed have an effect?

- 3 grades of starter
  - 10-34-0 5 and 10 gallon per acre
  - 4-10-10 5 and 10 gallon per acre
  - 3-18-18 3.4 and 6.8 gallon per acre
- Applied
  - Dual band above the seed in 04
  - Below seed in 05 and 06
  - With seed in 04, 05, and 06
  - Single band above the seed in 04, 05, 06



Seed Placed Attachments

Site information

	pH	P	K	OM	
Site		- ppm -		%	Texture
S04	6.6	63	215	4.3	silty clay loam
B04	6.5	133	68	1.0	fine sandy loam
R05	6.4	24	157	4.5	silty clay loam
D05	6.2	24	78	1.4	fine sandy loam
R06	5.4	15	119	3.9	clay loam
B06	6.4	56	112	1.3	fine sandy loam

Fertilizer grade effects on SCL and CL sites

	Plant population	Grain yield
Fertilizer grade	% of control	Bu/A
10-34-0	99	201
4-10-10	99	200
3-18-18	99	201
Check	33250	201

Fertilizer rate effects on SCL and CL sites

	Plant population	Grain yield
Fertilizer grade	% of control	Bu/A
High	99	201
Low	99	200
Check	33250	201

Fertilizer placement effects on SCL and CL sites

	Plant population	Grain yield
Fertilizer placement	% of control	Bu/A
With seed	99	198
single band/above seed	99	201
Dual band/below seed	99	203
Check	33250	201

Silty clay loam and clay loam soils.

- The use of seed placed fertilizer did not reduce population or affect the grain yield.
- Any application location will work equally as long as the soil is moist.

What about the sandy sites?

		Dual band above row		With seed		Single band above row	
		high	low	high	low	high	low
Site		---------- % of control ----------					
B04	10-34-0	81	99	88	108	84	107
B04	4-10-10	110	107	112	107	111	103
B04	3-18-18	100	109	106	102	114	103

Similar results at B06 site.

What about the sandy sites?

		With seed		Single band above row		Below seed	
		high	low	high	low	high	low
Site		---------- % of control ----------					
D05	10-34-0	67	93	69	94	68	85
D05	4-10-10	93	105	90	103	92	102
D05	3-18-18	95	106	102	107	91	104

Grain yields at sandy sites

- Grain yields followed population effects.
  - Reduction with high rate of 10-34-0 at B04 and B06 sites.
  - Reduction with high rates of all materials at the D05 site. Reduction with the low rate of 10-34-0 also.
  - The placement of the band did not affect grain yields on sandy soils.

Summary

- Seed placed fertilizer can increase immobile nutrient uptake in the plant.
- Seed placed fertilizer is a double edged sword – a little is good, too much is no good. If you reduce stand, you will reduce grain yield.
- Seed placed urea is not good. Need soil between band and seed.

Starter fertilizer

- On heavy textured moist soils, a seed placed band can be used up to a point.
  - 8 gallons of 10-34-0 as an example.
- On sandy soils, seed placed fertilizer can cause population problems. The soil can dry out after planting. 10-34-0 tends to be more of a problem.
- The ammonium in the starter may be more of a problem than the salt from the K

Questions ?