SHORT SUBJECTS ON SOIL FERTILTY

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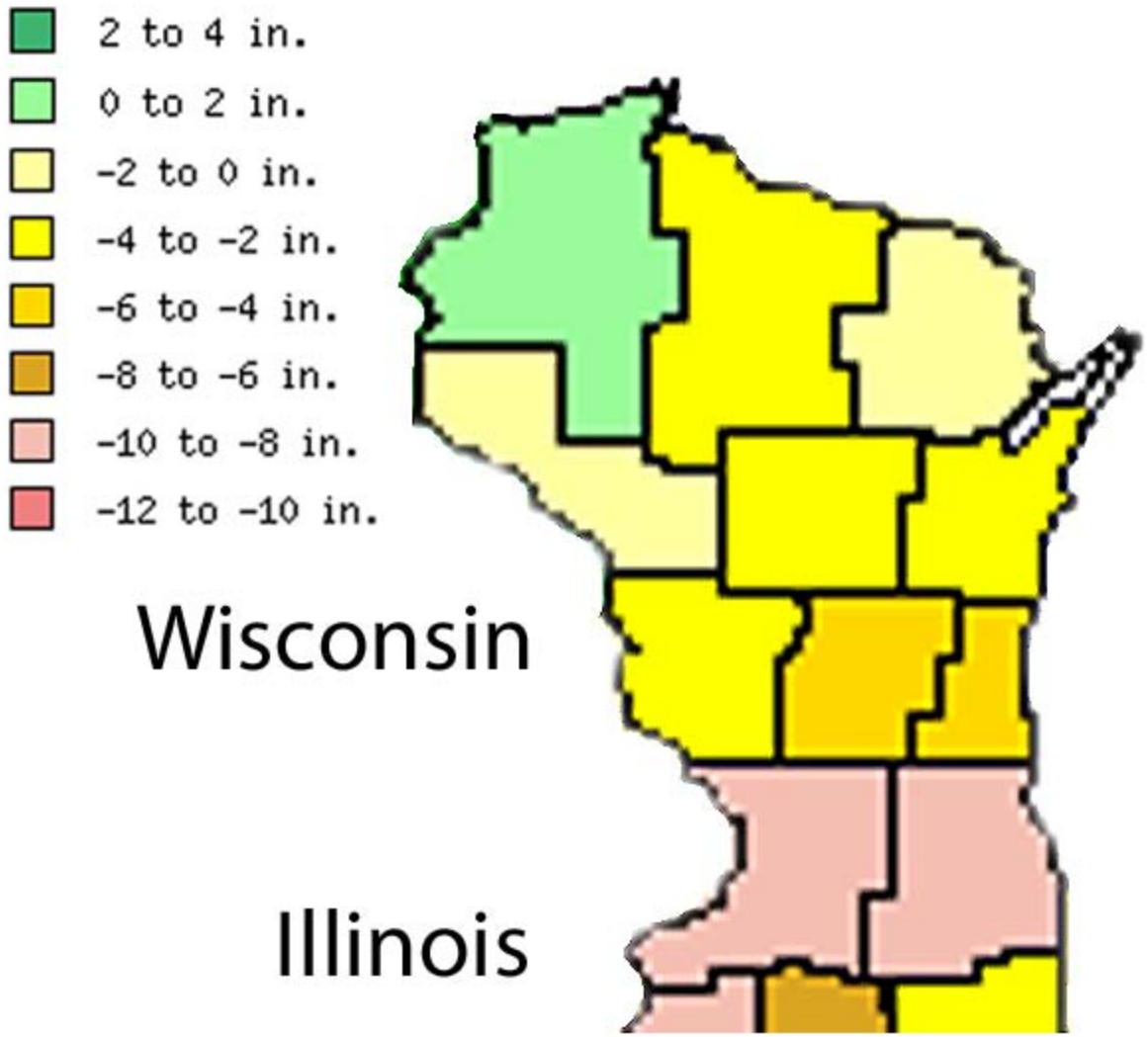
POTENTIAL FOR N CARRYOVER & PREPLANT SOIL NITRATE TESTING IN 2006

Precipitation Relative to Normal, May-October 2005



End-of Season Soil Nitrate-N, Arlington, WI, October 2005

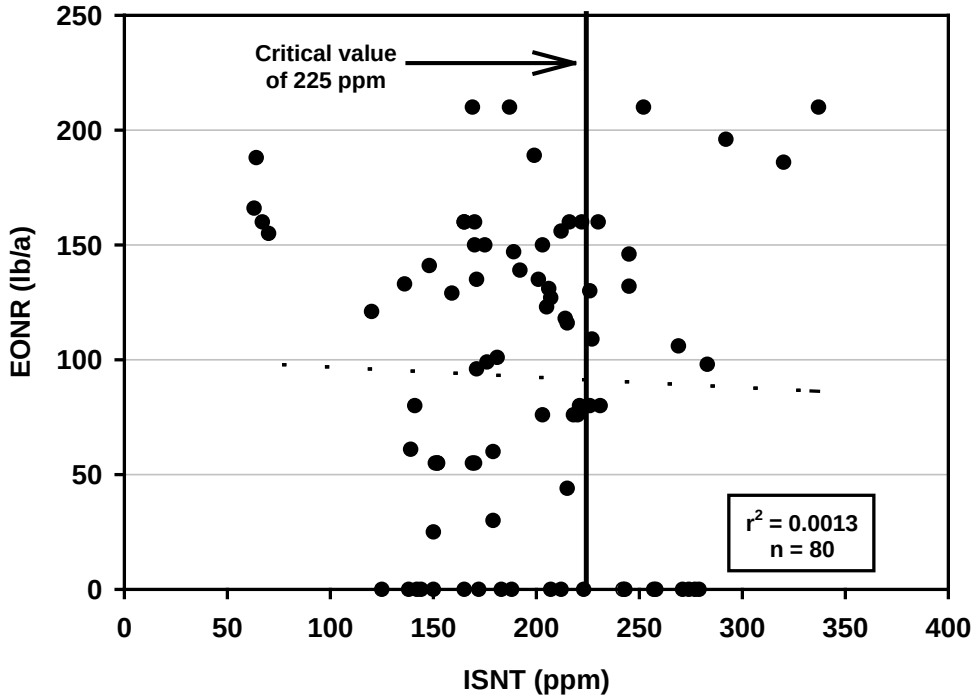
	Rate	Yield	Soil Nitrate-N, lb/acre			
Site	lb N/a	bu/a	0-1 ft	1-2 ft	2-3ft	Total
1 CC	125 aa	161	30	15	10	55
	250	177	183	113	76	372
2 CC	160 an	197	69	15	10	94
	205 m	189	82	38	15	135
3 NT SbC	210 un	--	83	9	9	101

Using the Illinois Soil Nitrogen Test (ISNT) in Wisconsin

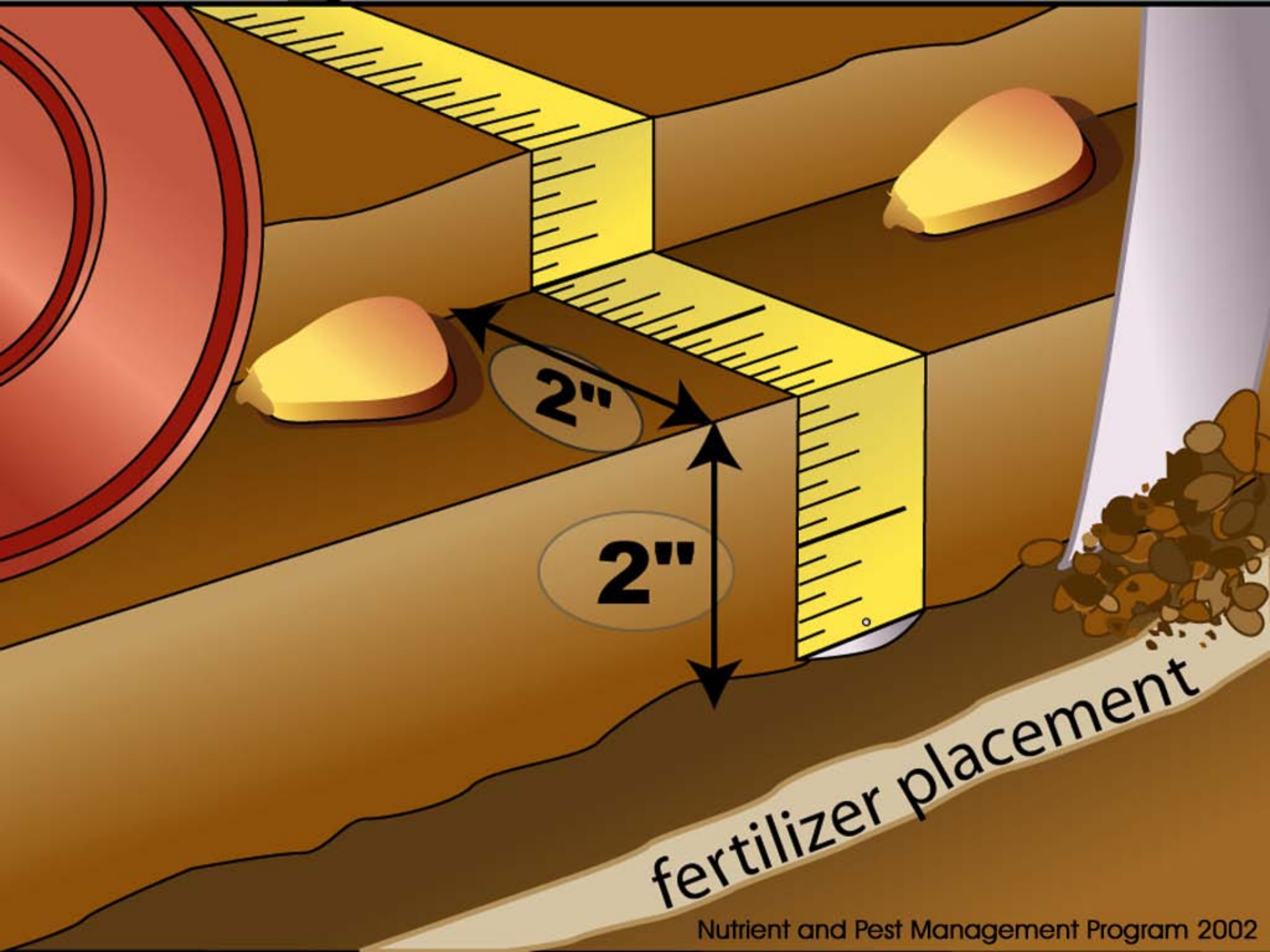
- ISNT evaluated in 80 experiments during 1984-2004
  - Range of soils, cropping systems and management histories
  - Wide range of anticipated and observed N response

Results with the Illinois soil nitrogen test in Wisconsin

- No relationship between ISNT and EONR
- Critical value of 225 mg kg^{-1} did not separate responsive from non-responsive sites



STARTER FERTILIZER COMPOSITION


2"
2"
fertilizer placement
Nutrient and Pest Management Program 2002

Starter Fertilizer Composition

- Urea in seed-placed starter
- Salt index effects
- Toxicities
  - Usually materials that release ammonia (NH_3) after application
  - eg., urea, UAN, ammonium thiosulfate

Urea in seed-placed starter

- Ammonia from urea does the damage
  - More problems with dry soils, sandy soils
  - Use alternative N sources

Salt Index Effects

- Damage from salt effect
- Varies with fertilizer materials
- More problems in dry or sandy soils
- Limit seed-placed N + K_2O to 10 lb/acre
- Avoid materials with high salt index

Salt Index Values of Fertilizer Materials

Fertilizer	Salt index
Ammonium nitrate	104
Ammonium sulfate	68
Ammonium thiosulfate	90
Urea	74
DAP	29
MAP	27
Potassium chloride	120
Potassium sulfate	43

POTASSIUM (K) ISSUES

Potassium Issues

- Unexpected soil test K decrease
  - Dry soils at sampling
  - Removals exceed additions
- More K deficiency seen
- Economics of K use
  - Higher K fertilizer cost
  - Does this affect optimum K rates?
  - Goals include crop needs and soil K level

Potash Removal and Rates

Crop	Yield	K_2O removal**
		lb/acre
Corn grain	160 lb/a	45
Corn silage	22 tons/a	135
Soybean	50 bu/a	50
Alfalfa	5 tons/a	250

** Recommended rate at optimum soil test K (90-110 ppm)

Corn yield response to soil test K, Arlington, WI (4-yr Ave.)

Soil test K		% of maximum
Category	ppm	yield
Very low	<70	69
Low	70-90	77
Optimum	90-110	93
High	110-150	98
Ex. high	>150	100

Alfalfa yield response and economic return from K fertilization, Arlington, WI*

K_2O applied lb/acre	Yield tons DM/ acre	Return, $/acre $/lb K_2O $0.12	Return, $/acre $/lb K_2O $0.19
0	2.88	288	288
60	3.53	346	342
120	3.73	359	351
240	4.00	371	354
480	4.23	365	331
720	4.41	355	305

* Hay price = $100/ton, Low initial soil K.

Why more K deficiency?

1. Low soil K and/or application rate
2. Slow root development from cold, wet soils
3. Soil compaction / low oxygen
4. Shift to reduced or no till systems
5. Low K / no K starter fertilizers (corn)
6. Fewer dairy farms – less manure
7. More corn harvested as silage
8. Soybean aphids - soybeans

M. Rankin, UW-Extension