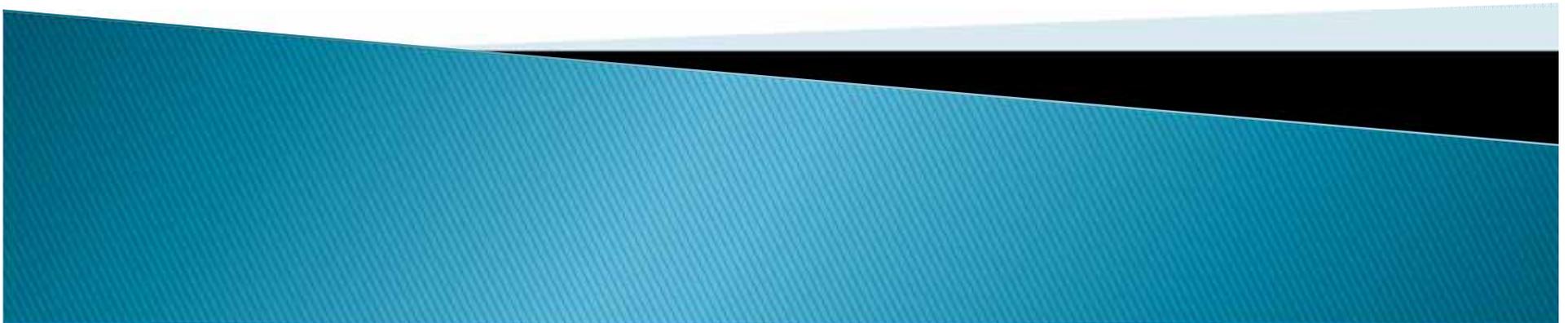


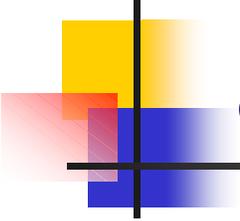
Rate of Change in Soil Test Values for P and K

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The Situation

- ▶ Low commodity prices (unacceptable)
- ▶ Input costs are still high
- ▶ Cash flow is not good
- ▶ So, what can be done with fertilization; short time and long term?
- ▶ This presentation will focus on use of P and K and changes in soil test values for each



RELATIVE SOURCES OF NUTRIENTS AT DIFFERENT SOIL TEST LEVELS

SOIL
TEST
LEVEL
HIGH



IGH



DIUM



OW



OW



NUTRIENTS
AVAILABLE
FROM SOIL

NUTRIENTS REQUIRED FROM FERTILIZERS

* (Fertilizers used at "very high" levels are for "starter" or "maintenance" purposes.)

QUESTION

- ▶ How fast do soil test values for P and K change?
- ▶ Or, what happens if I reduce rate or not apply at all for a short period of time?
- ▶ Are there standard values that can be used to calculate rates of phosphate and potash needed to increase soil tests for P and K?



FIRST, LET'S UNDERSTAND THE MEANING OF RELATIVE OF SOIL TEST VALUES FOR P AND K

relative level	probability of a response, %
very low	95 to 100
low	65 to 95
medium	30 to 65
high or very high	10 to 30

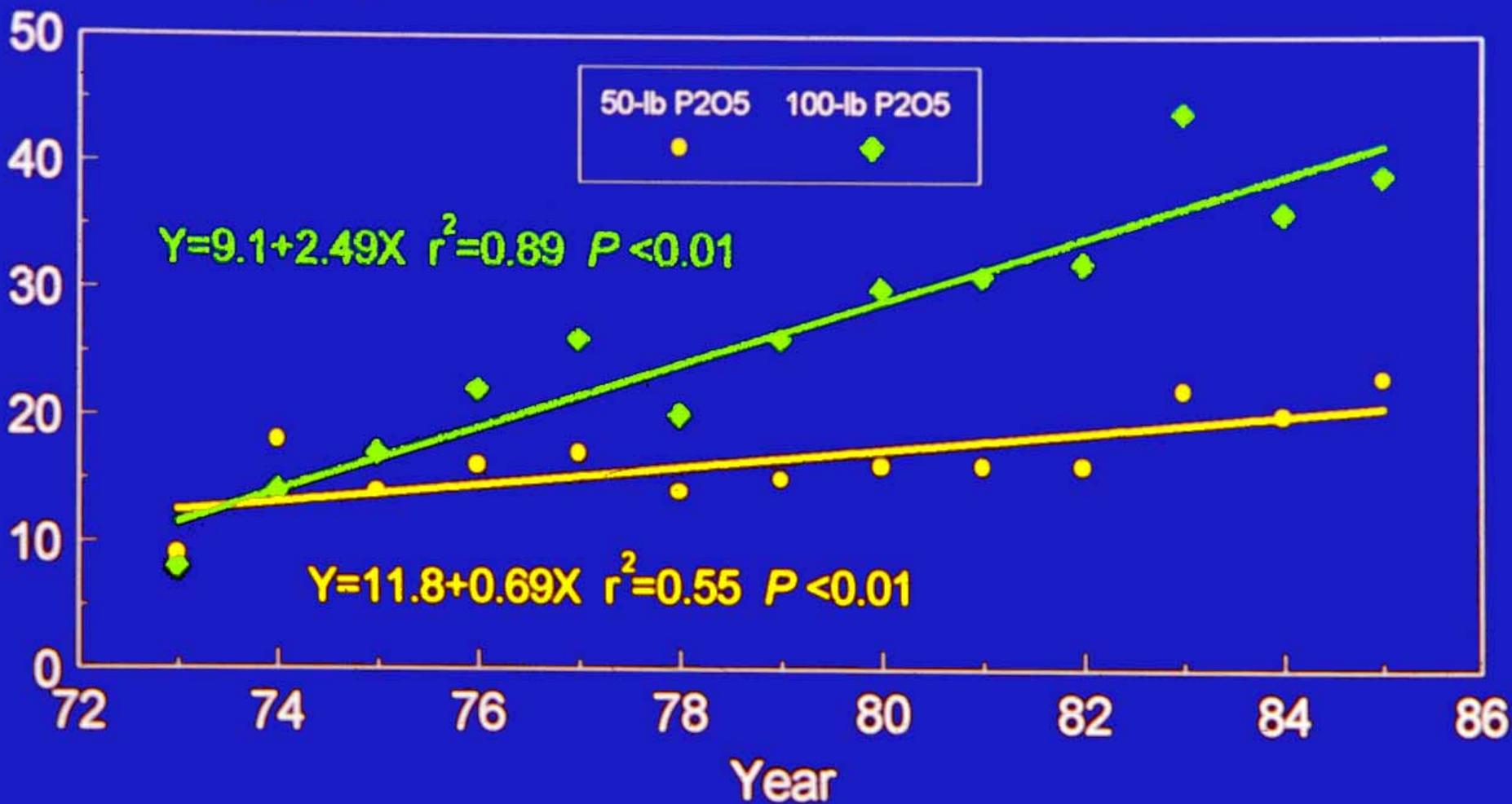
Now, Let's Look At Soil Test P



Incline rates of STP during a 12-yr period of annual application as influenced by P rate.

Morris

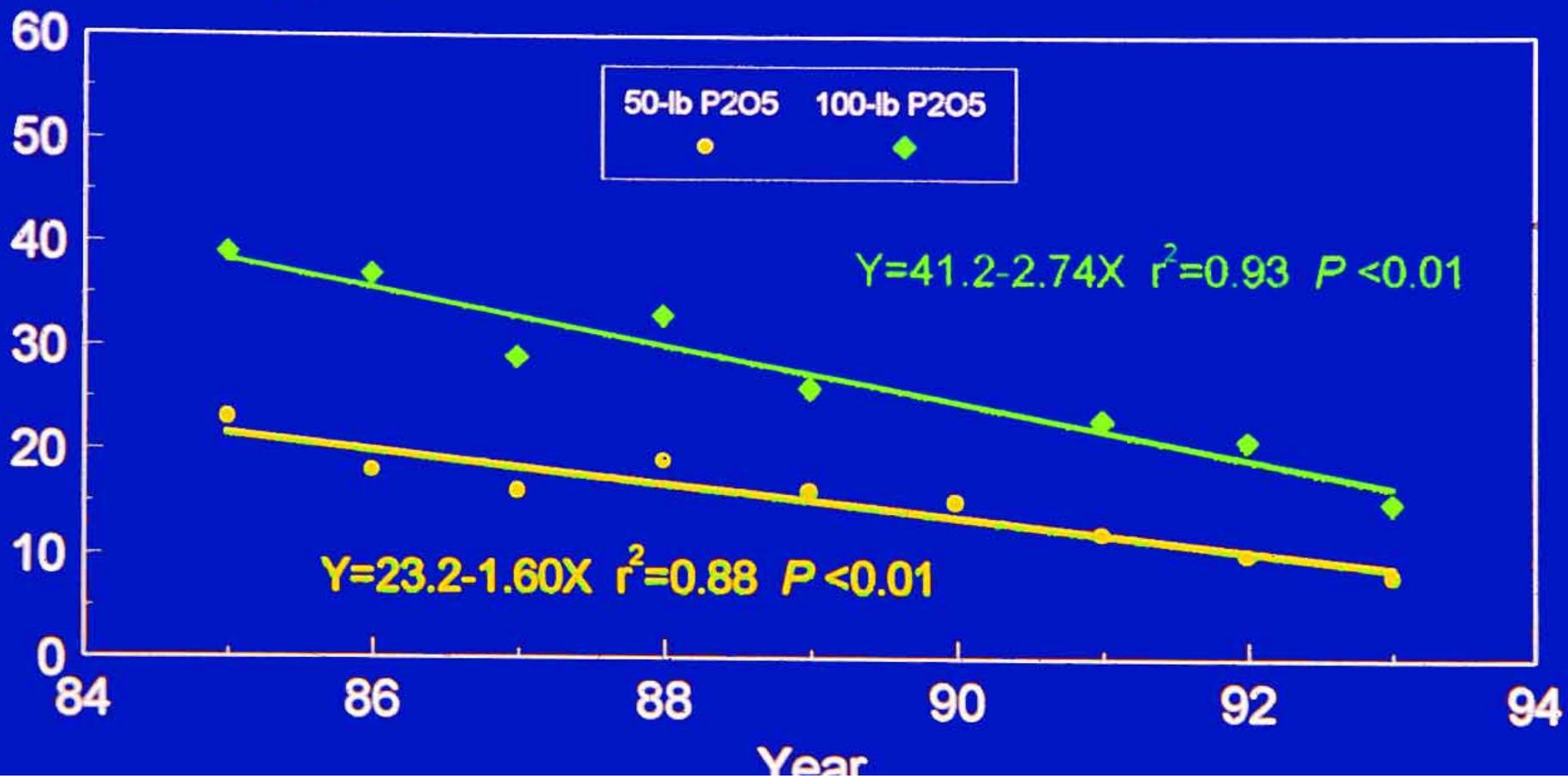
Soil Test P (ppm)

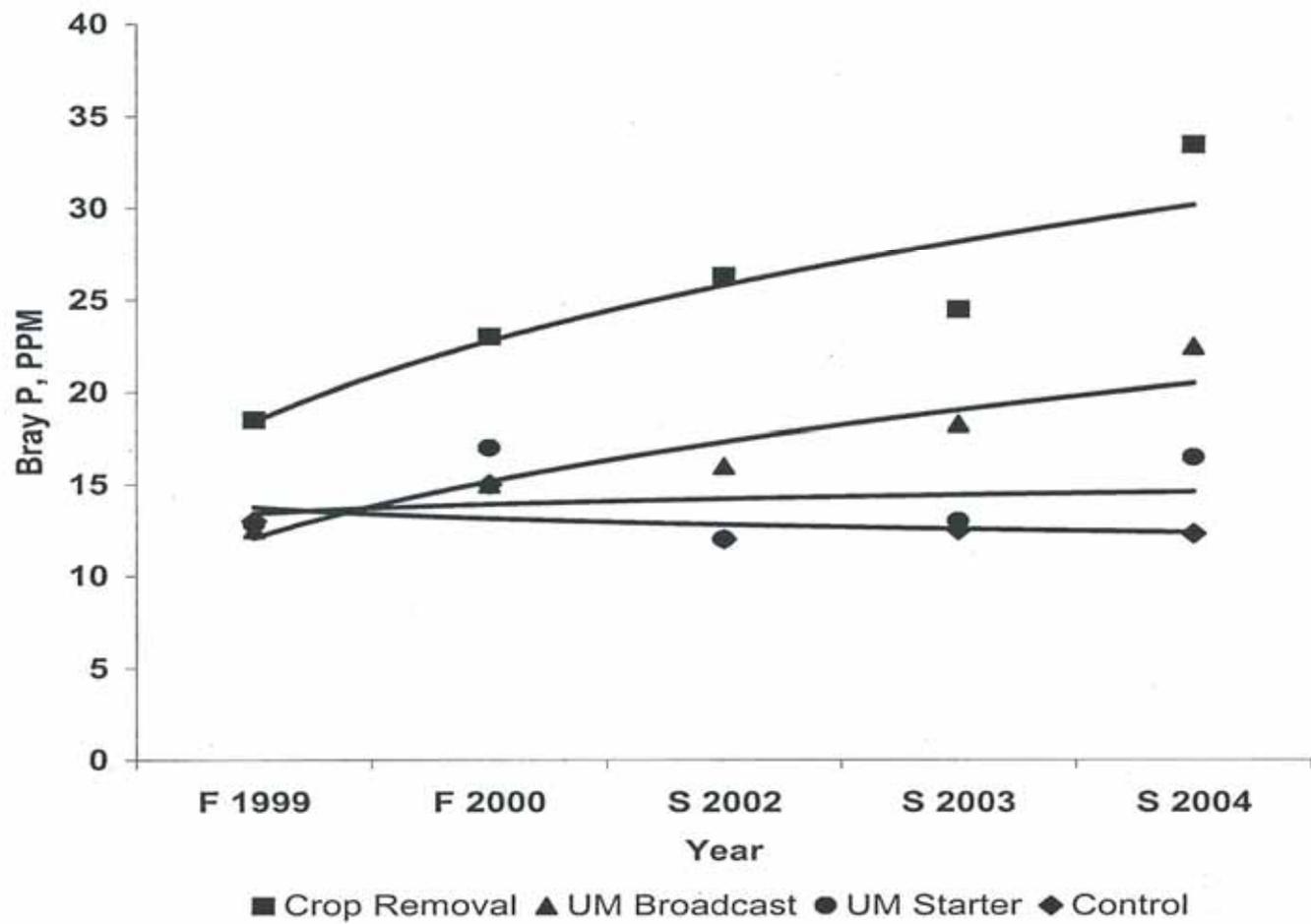


Decline rates of STP for an 8-yr period when no fertilizer P was applied to a high testing soil.

Morris

Soil Test P (ppm)





PHOSPHATE APPLIED -- WASECA

Timing	Concept	Corn	Soybeans
annual - bdcst	crop removal	60	45
annual - bdcst	U of M recs	40	15
annual - band	U of M recs	30	15

rates listed are lb. P2O5 /acre

Change in soil test P and K – Sibley County

acid soil

calcareous soil

lb./ ppm

P -- 34 lb. P₂O₅/acre

33 lb. P₂O₅ /acre

K –11.8 lb. K₂O/acre

7.4 lb.K₂O/acre

CHANGE IN SOIL TEST P – ROCHESTER

	Year		
P2O5 Rate	2010	2014	
lb./acre	ppm P		
0	11.8	5.4	
27	13.3	11.4	
51	13.8	19.1	

CHANGE IN SOIL TEST P (Olsen) – CORN YIELD – MORRIS

P2O5 Rate	Year		Yield (2013)
	2010	2013	
lb./acre	ppm P		bu./acre
0	11.4	4.4	110
37	10.6	6.1	114
73	11.9	11.8	121

CHANGES IN SOIL TEST P --- WABASHA COUNTY

P2O5 Rate	Bray P
lb./acre	lb. P2O5/acre/ppm P
48	10.9
92	11.6
184	12.0
Initial Bray P = 12ppm	

Let's Look At Soil Test K



CHANGES IN SOIL TEST K --- WASECA

	Date		
K2O Rate	April, 2012	April, 2014	Yield, 2014
lb./acre	ppm K	ppm K	bu./acre
0	100	95	100
60	105	130	158
120	120	150	178

CHANGES IN SOIL TEST K ---BECKER

	Date		
K20 Rate	April 2012	April 2014	Yield (2014)
lb./acre	ppm K		bu./acre
0	48	45	125
60	70	61	220
100	85	80	218

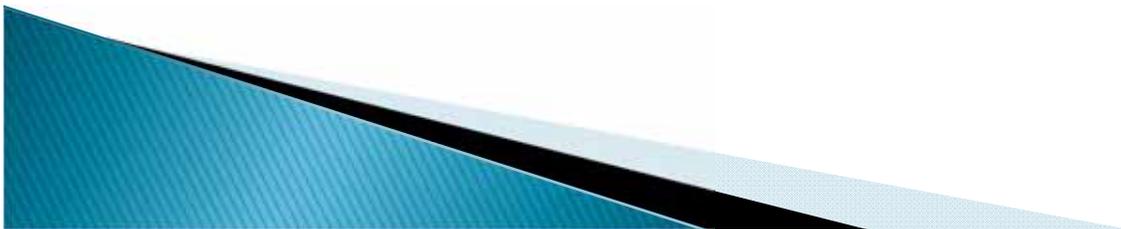
Some Conclusions

- ▶ Changes in soil test P and K are not consistent
- ▶ Changes are related to soil properties such as texture, pH, soil moisture (especially K)
- ▶ Many studies in the literature have produced variable results directly related to the production environment
- ▶ There is no standard agreement on values to use for hoped for changes



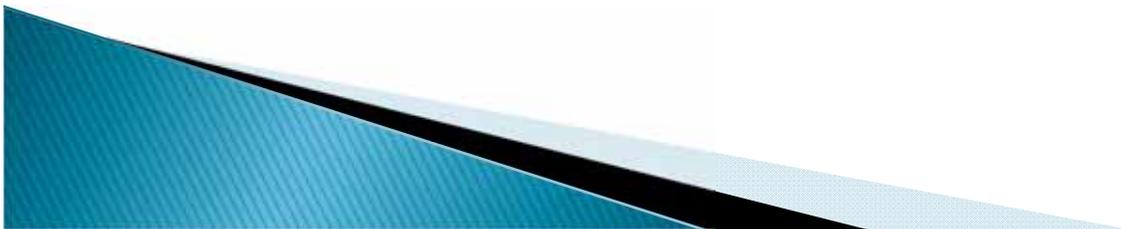
Conclusions, continued

- ▶ Changes are not rapid
- ▶ There can be some reduction in rates of application of phosphate and potash in the short term without dramatic changes in soil test values for P and K
- ▶ Plan for applications (especially in a band) if soil test levels for P and K are low or very low.
- ▶ Always use results of the soil test as a guide



Conclusions, continued

- ▶ Soil test values in the medium range are satisfactory.
- ▶ Planning for banded applications is satisfactory especially in years when potential profit margins are slim.





Corn Yield and Soil Test P (Bray), Rochester, 2013

soil test P	yield
ppm	lb./acre
6.8	226
12.1	230
16.2	230
22.6	230