Rate of Change in Soil Test Values for P and K

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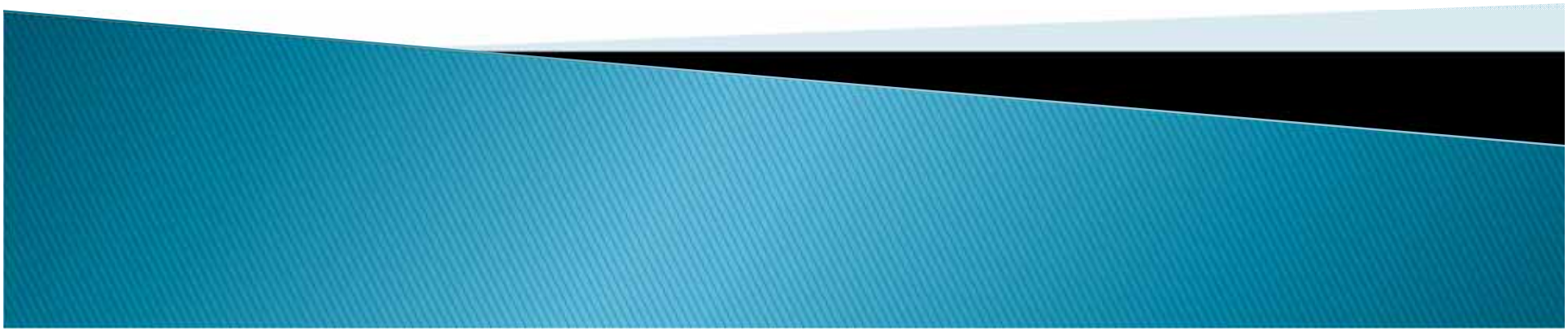

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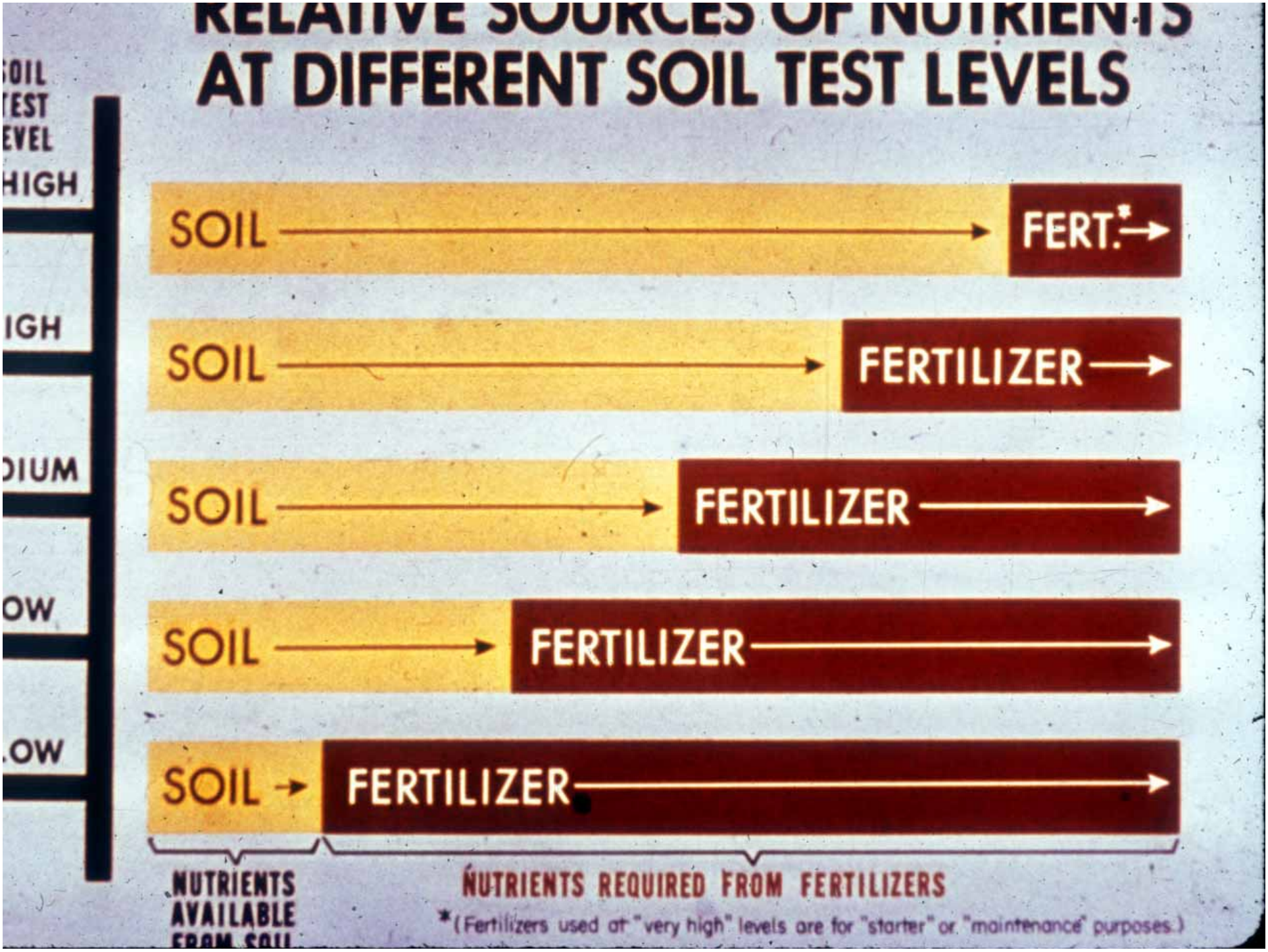
The Situation

- 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



QUESTION

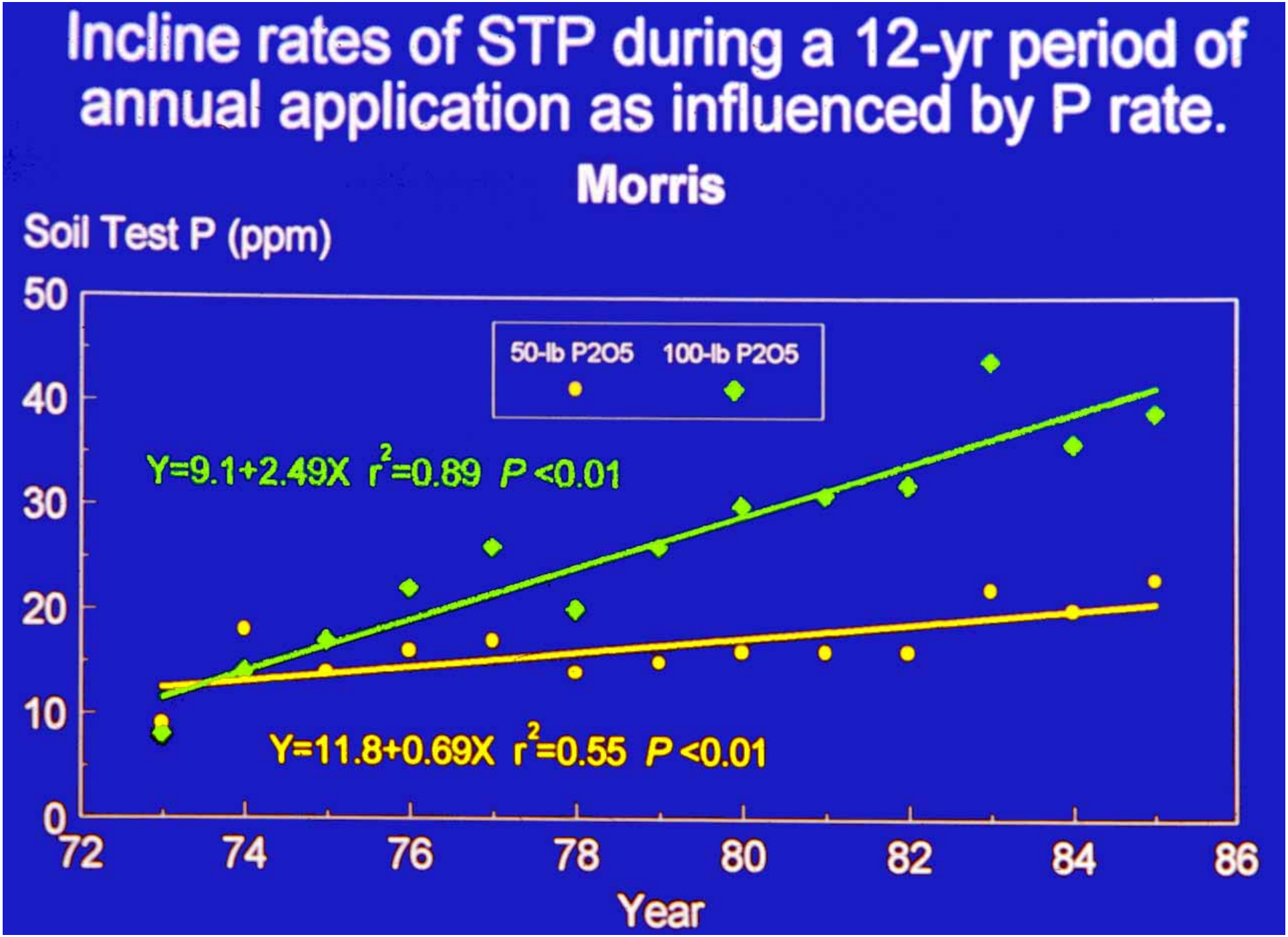
- How fast do soil test values for P and K change?
- Or, what happens if I reduce rate or not apply at all for a short period of time?
- Are there standard values that can be used to calculate rates of phosphate and potash needed to increase soil tests for P and K?

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

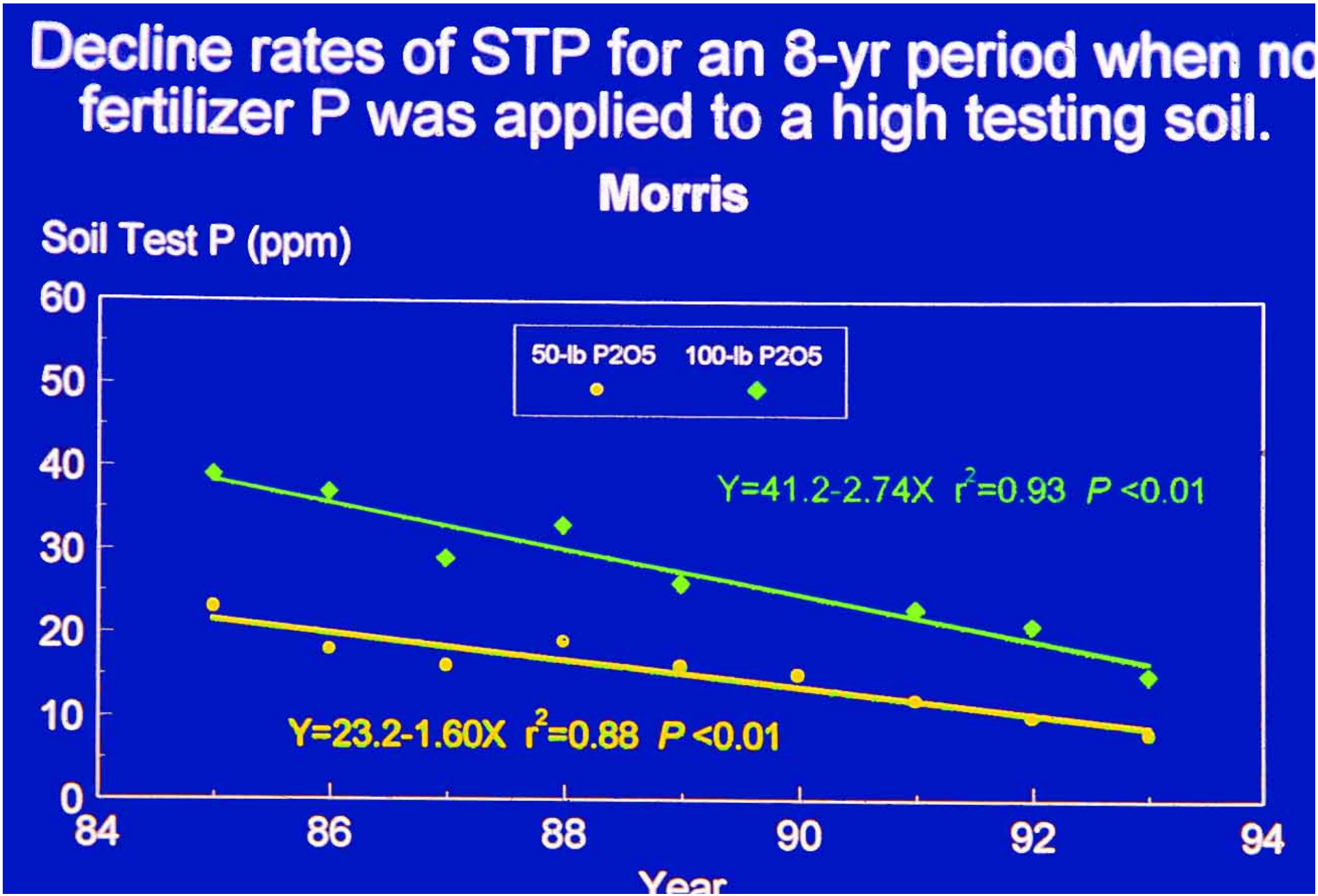
relative level	probability of a response, %
very low	95 to 100
low	65 to 95
medium	30 to 65
high or very high	10 to 30

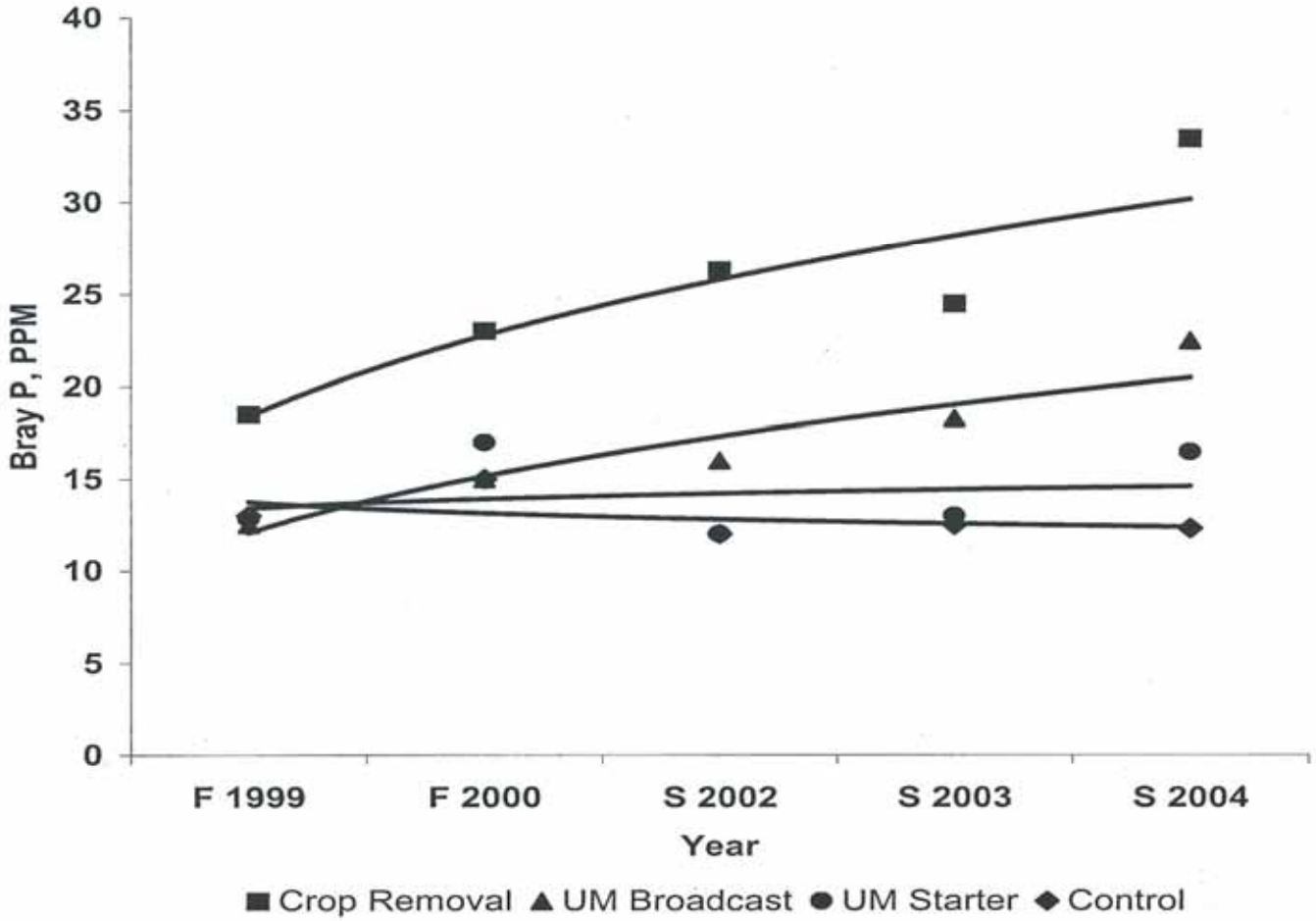
Now, Let's Look At Soil Test P

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



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




40
35
30
25
20
15
10
5
0
Bray P, PPM
F 1999
F 2000
S 2002
S 2003
S 2004
Year
Crop Removal
UM Broadcast
UM Starter
Control

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. P_2O_5 /acre			

Change in soil test P and K – Sibley County	
acid soil	calcareous soil
lb./ ppm	
P -- 34 lb. P_2O_5/acre	33 lb. P_2O_5 /acre
K –11.8 lb. K_2O/acre	7.4 lb.K_2O/acre

CHANGE IN SOIL TEST P – ROCHESTER

	Year		
P_2O_5 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

	Year		
P2O5 Rate	2010	2013	Yield (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