Determination of the Amount of Moisture to Maximize Burley Crop Yield

by

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RESULTS FROM PREVIOUS STUDY

Growing Season Critical Moisture Intervals (CMI)

LOCATION	Starting Day	Length Days	Yield Correlation
Lex-Fayette	53	12	+0.4419**
Lou-Shelby	57	13	+0.4889**
Pad-Ballard	55	11	+0.3934**

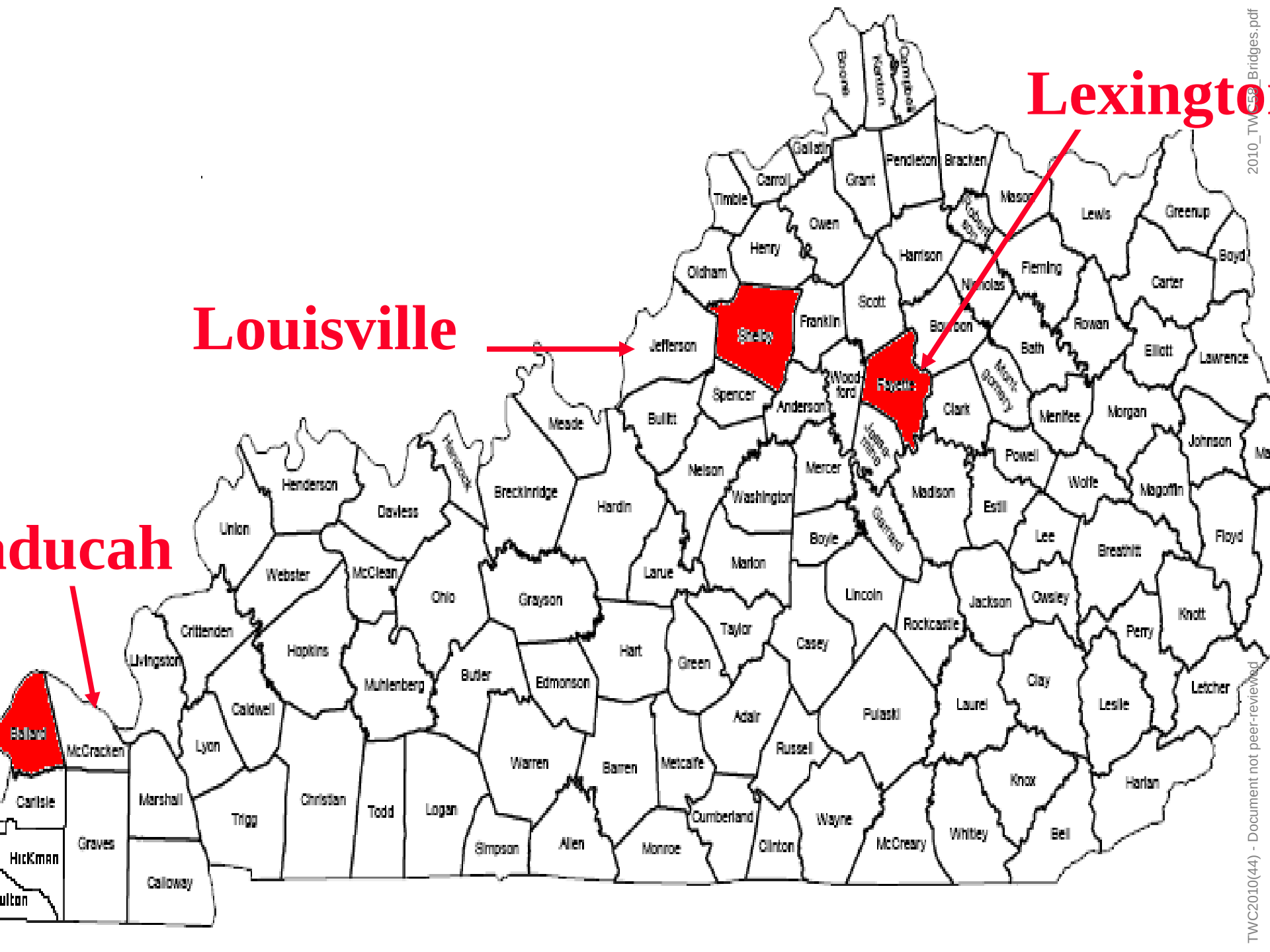
** < 1 %

WEATHER VARIABLES

- 42 Years (1959 – 2000) Daily Precipitation and Evapotranspiration
- Three Kentucky Locations

  Lexington, Louisville and Paducah
- Seasonal Soil Moisture Index

Kentucky Study Locations



SUMMARY of FINDINGS

- Average Results for the Three Locations Indicated the CMI Begins 55 Days in the Growing Season
- Approximate Length of CMI Interval is 2 Weeks

QUESTION

What Amount of Moisture During the CMI is Necessary to Maximize Crop Yield

PROCEDURE

- Determine the Amount of Yield Increase During the CMI
- Establish the Progress in Crop Yield Prior to the CMI
- Predict Yield Increase Using the CMI Precipitation

Establishing Crop Yield Prior to the CMI

- Lack of Data Measuring Crop Yield During Growing Season
- Precipitation Prior To CMI

Soil Water Stress Test on Burley

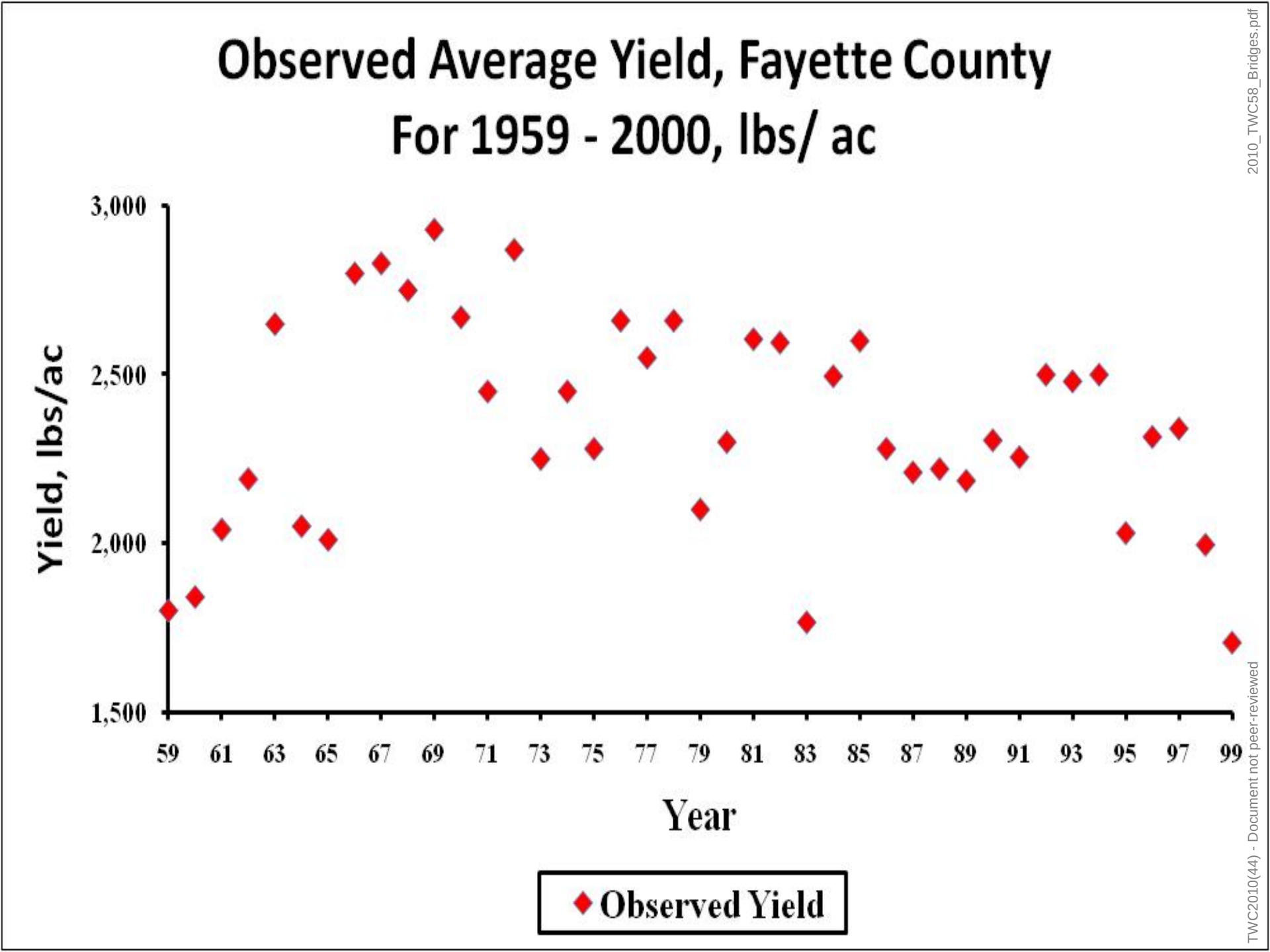
Phillips, Leggett, Zelenznik and Sutton. 1984

TREATMENT	Rain inches	Irrigation inches	Yield lb/ac
Check	7.0	0.0	1125
Irrigated Full Season	0.4	6.0	2825
Early Stress	0.4	5.6	2875
Stressed Full Season	0.4	0.0	1250

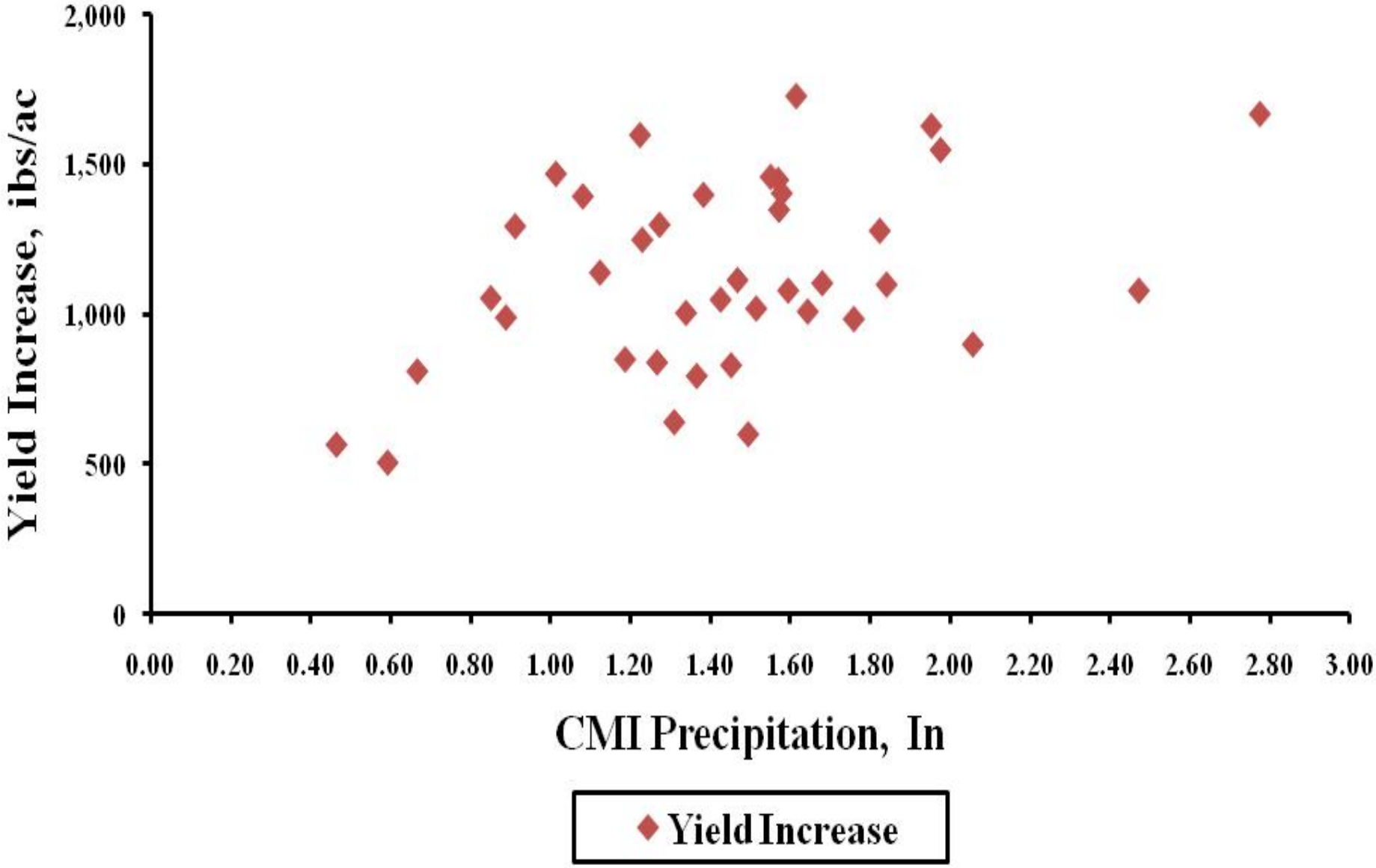
Base Yield Prior to CMI

- Using Values From Phillips, Leggett study, Base Yield was Fixed at 1200 lbs/acre
- Detriment In Using a Set Value is There is No Variance in Crop Seasons

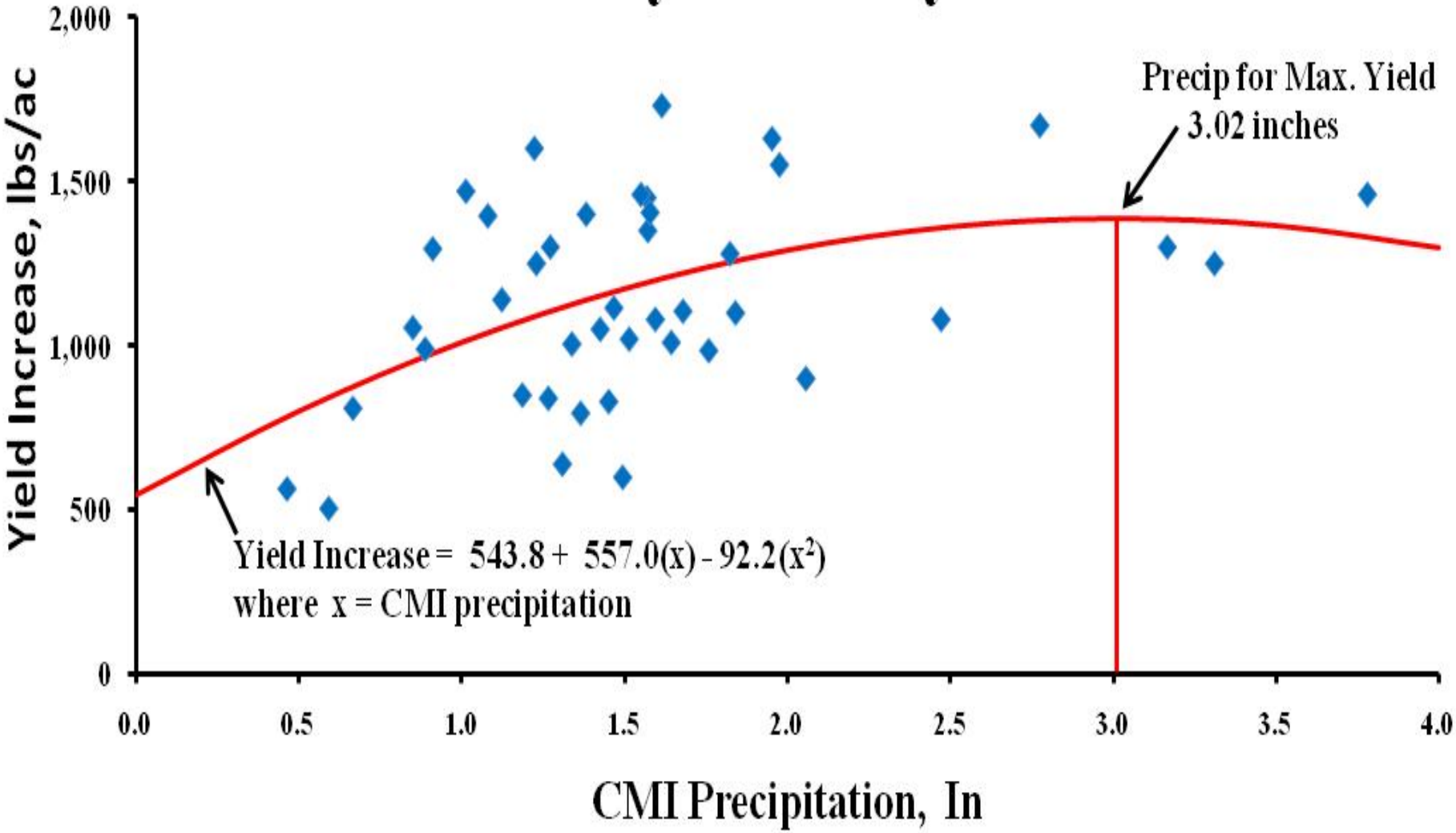
RESULTS



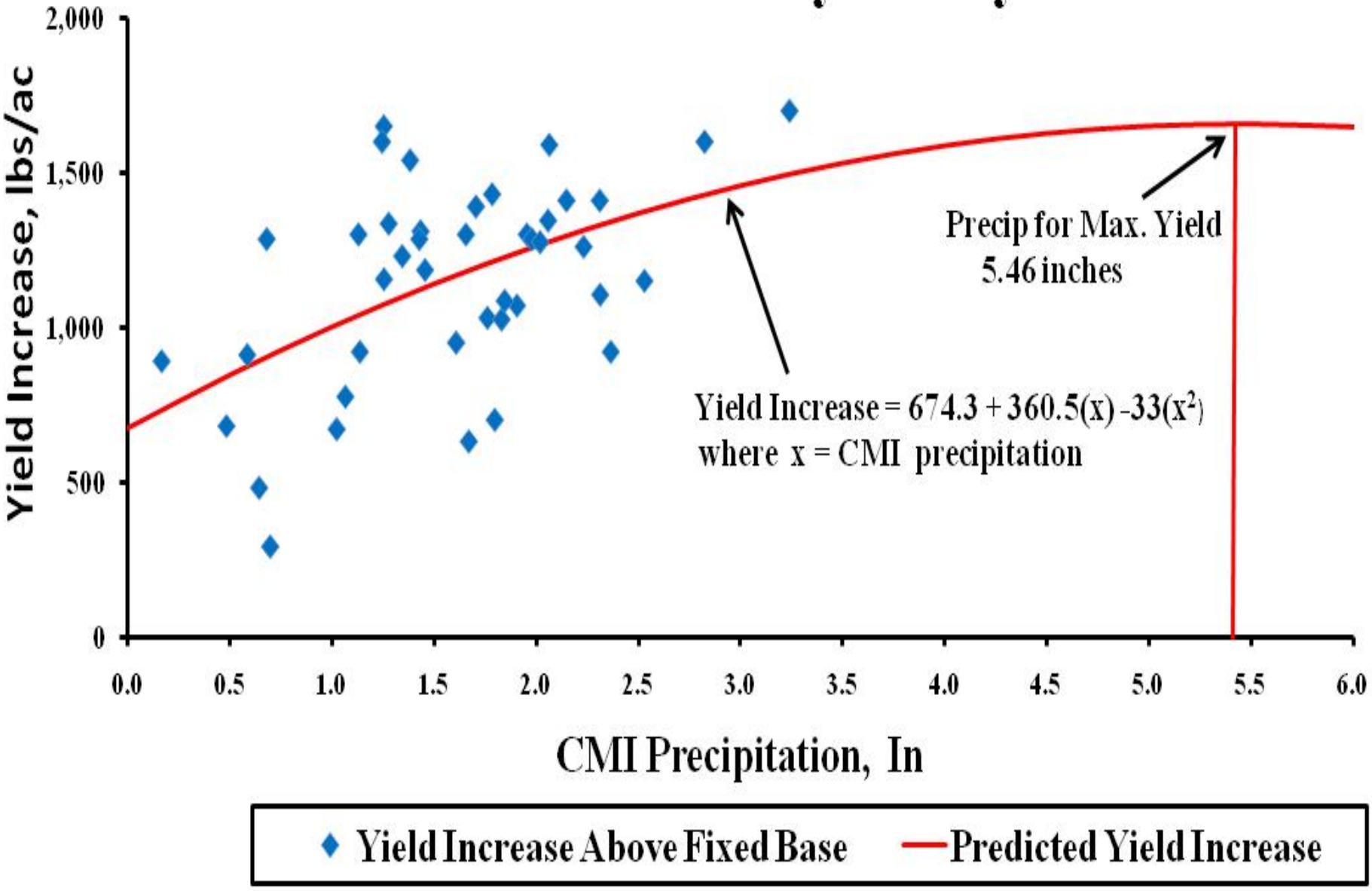
CMI Yield Increase vs Precipitation for Fayette County Using 1200 lb Base



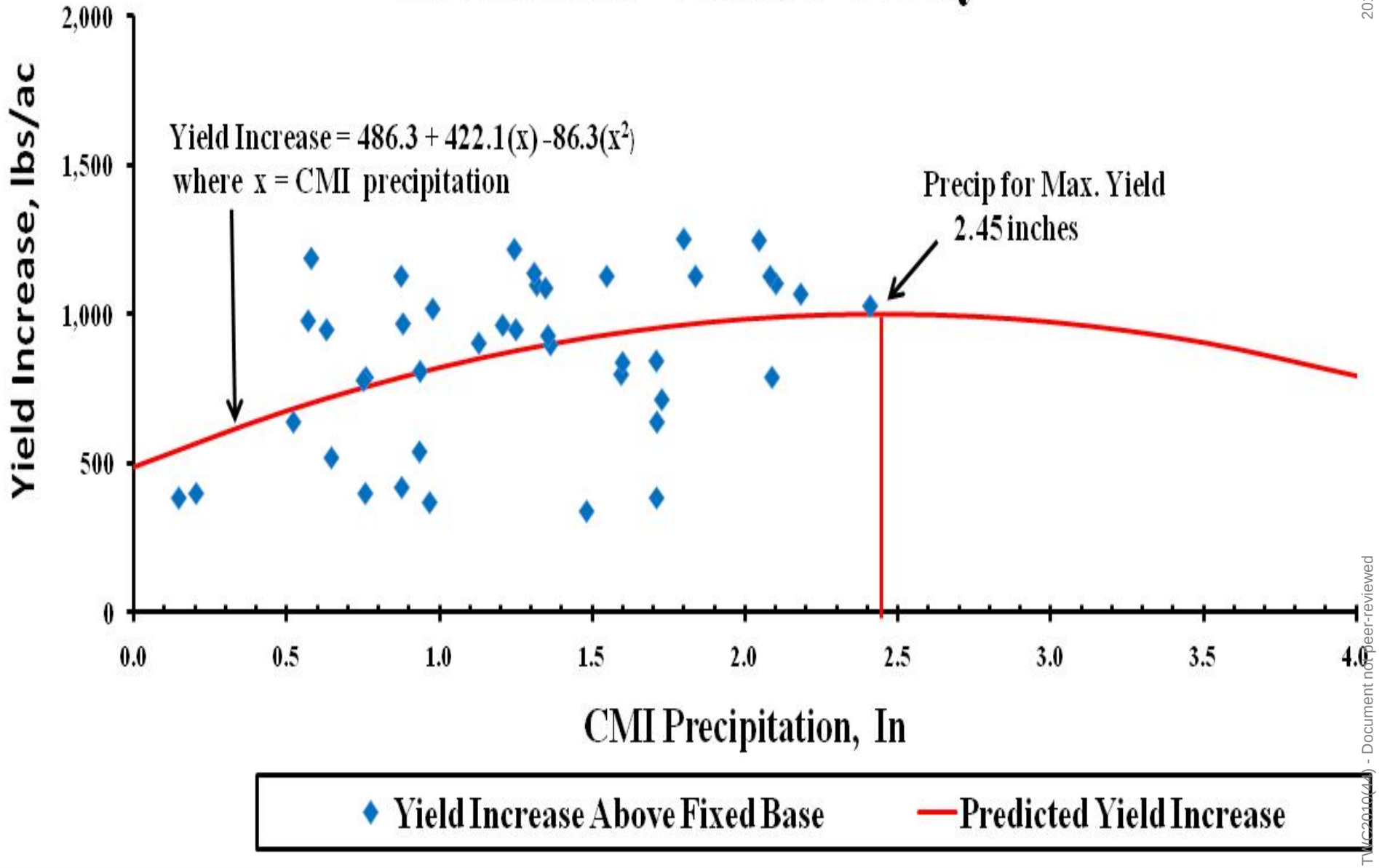
Predicted and Observed CMI Yield Increase for Fayette County



Predicted and Observed CMI Yield Increase for Louisville - Shelby County



Predicted and Observed CMI Yield Increase for Paducah - Ballard County



Maximum Yield Increase Predicted For Inflection Point

LOCATION	Precip at Inflection inches	Yield Increase lb/ac
Lex-Fayette	3.02	1,385.0
Lou-Shelby	5.46	1,658.0
Pad-Ballard	2.45	1,002.0
Average	3.64	1,348.0

Yield Increase vs Various Precipitation Values

	CMI Precipitation (in)		
	1.0	3.0	5.0
LOCATION	Yield Increase		
Lex-Fayette	1,009.0	1,385.0	1,024.0
Lou-Shelby	1,002.0	1,459.0	1,651.0
Pad-Ballard	822.0	975.0	439.0
Average	944.0	1,273.0	1,038.0

SUMMARY

- Average Precipitation for Maximum Yield was 3.64 Inches Resulting in a Yield Increase of 1,348 lbs/ac
- On Average 1 to 3 Inches of Moisture During CMI For Yield Increase of 944 to 1,273 lbs/ac
- Better Estimate of Crop Progress Prior to CMI

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