
Is the Illinois Soil N Test (ISNT) Useful in Wisconsin?

Larry G. Bundy (retired)

Dept. of Soil Science

Univ. of Wisconsin

Why the interest in ISNT?

- Potentially addresses an important research and production need.
 - Continuing research activity with mixed results.
 - More articles on ISNT in producer publications.
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Why the interest in ISNT?

- Method of predicting soil N contribution to corn N supply
 - Soil N contributes a substantial portion of corn N need
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Contribution of Soil N to Yield

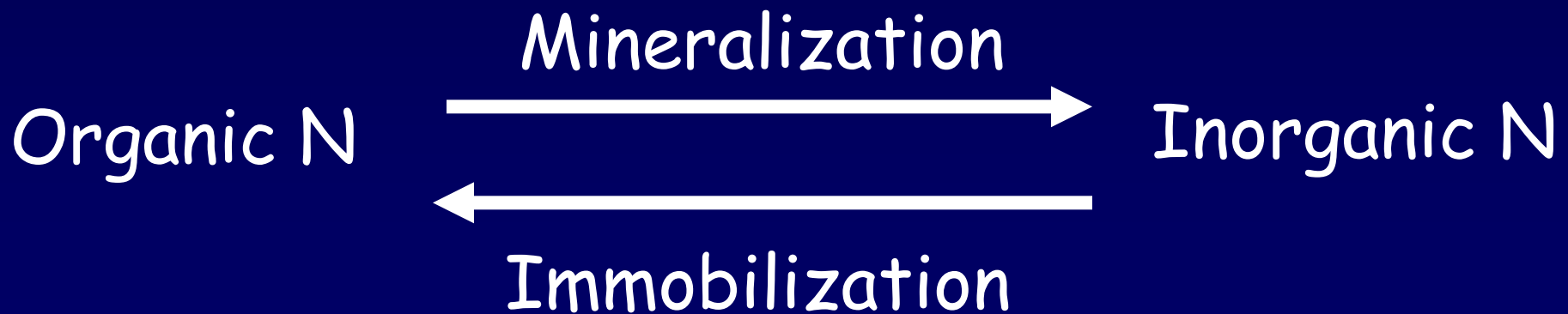
State	CC	SC
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	% ^{1/}	
Illinois	54	64
Iowa	45	75
Minnesota	60	76
Wisconsin	71	77
Mean ^{2/}	56	70

^{1/} Yield with zero N as % of yield at EONR.

^{2/} Mean of 271 CC and 427 SC sites. Sawyer et al., 2005.

Nitrogen Mineralization

Temperature
Moisture
Climate
Cropping system
Soil properties
C & N inputs



A Soil Example

- Example soil contains 3% organic matter (OM)
 - Example soil contains about 3000 lb/ acre of total N
 - Soil provides 50 to 150+ lb/acre/year of plant available N
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What determines the soil N contribution?

- Typically, soil organic matter content (OM) and total N are not sensitive indicators of the soil available N contribution
 - The readily available or mineralizable fraction of soil N indicates the soil N contribution
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Can laboratory tests predict the soil available N contribution?

Field



Lab



Laboratory tests for soil nitrogen availability, such as the ISNT, must predict what happens in the field over weeks or months.

Positive Evaluations of ISNT

State	Source	Year	No. field sites	Recommend
IL	Mulvaney	2001	25	Yes
IL	Mulvaney	2006	102	Yes
NY	Ketterings	2006	33	Yes ? w/OM
NY	Ketterings	2009	34	Yes ? w/OM
NC	Williams	2007	35	Yes

Negative Evaluations of ISNT

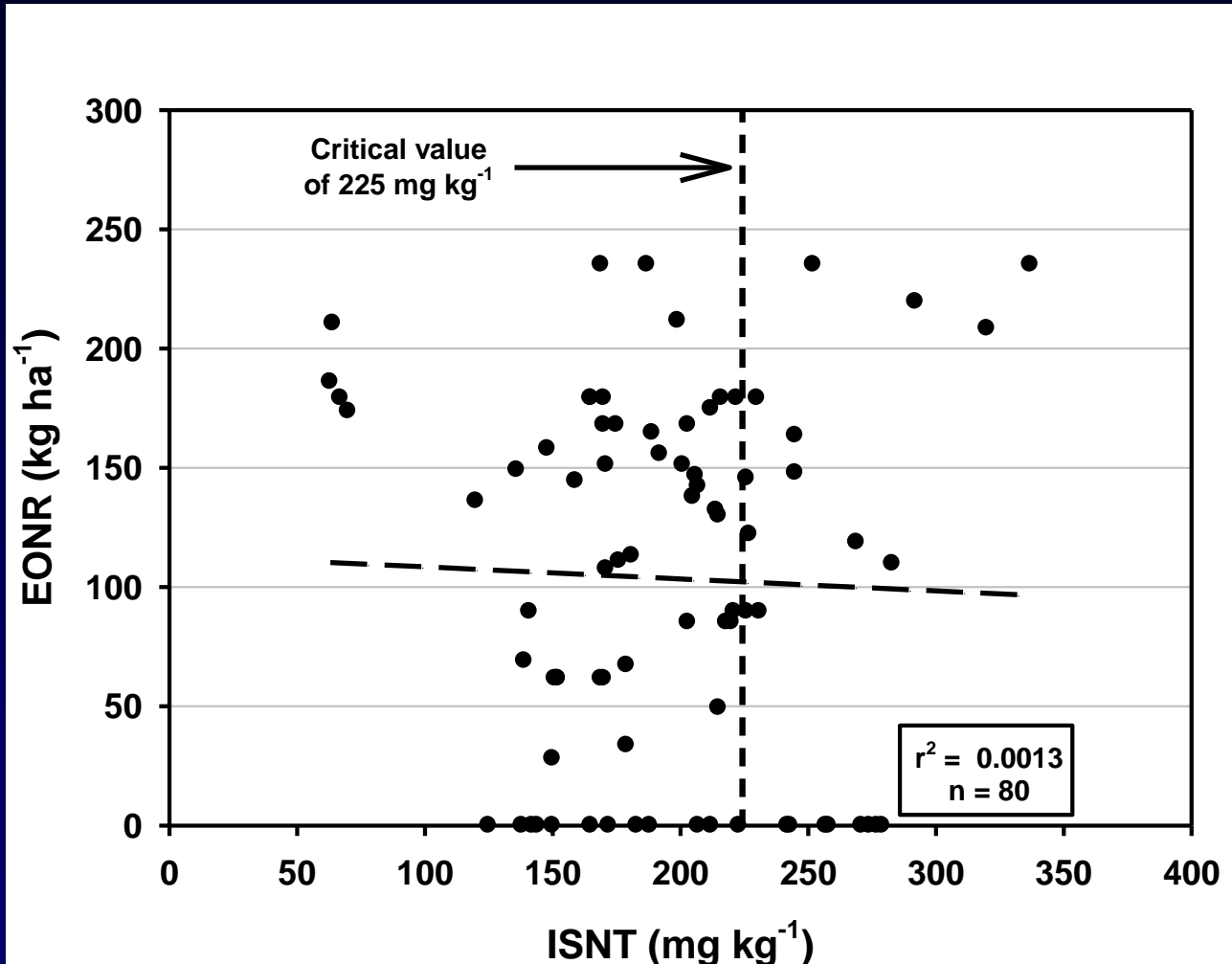
State	Source	Year	No. field sites	Recom-mend
IA	Barker	2006	43	No
IA	Sawyer	2007	14	No
WI	Osterhaus	2008	80	No
VA	Spargo	2009	34	No
Regional*	Laboski	2008	96	No

* Includes 6 states: IA, IL, MI, MN, NE, WI

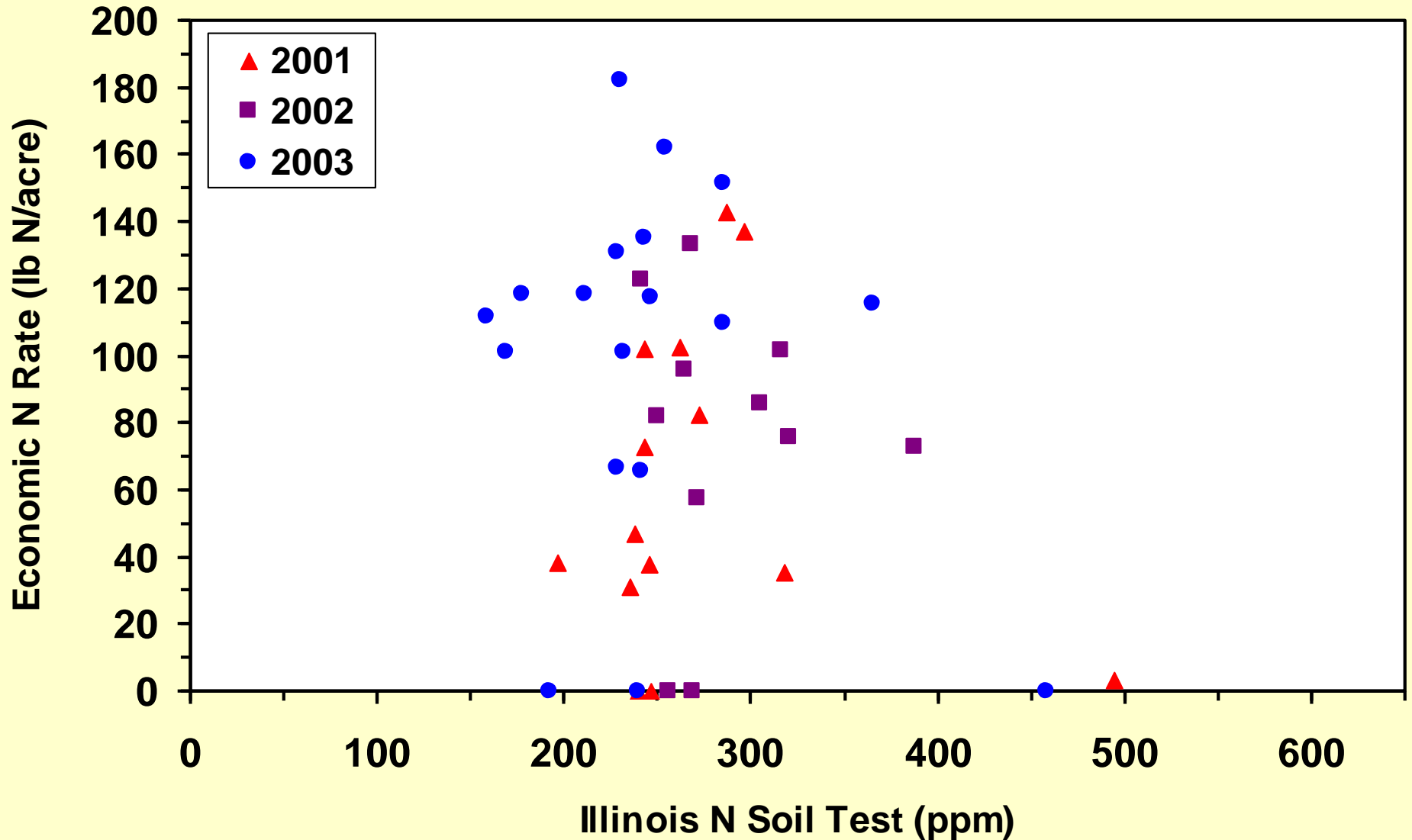
Reasons for Negative Evaluations

- Poor relationship between ISNT results and optimum N rates for corn in field experiments
 - No ability to separate N responsive from non-responsive sites
 - Strong correlation of ISNT to soil organic matter and total N
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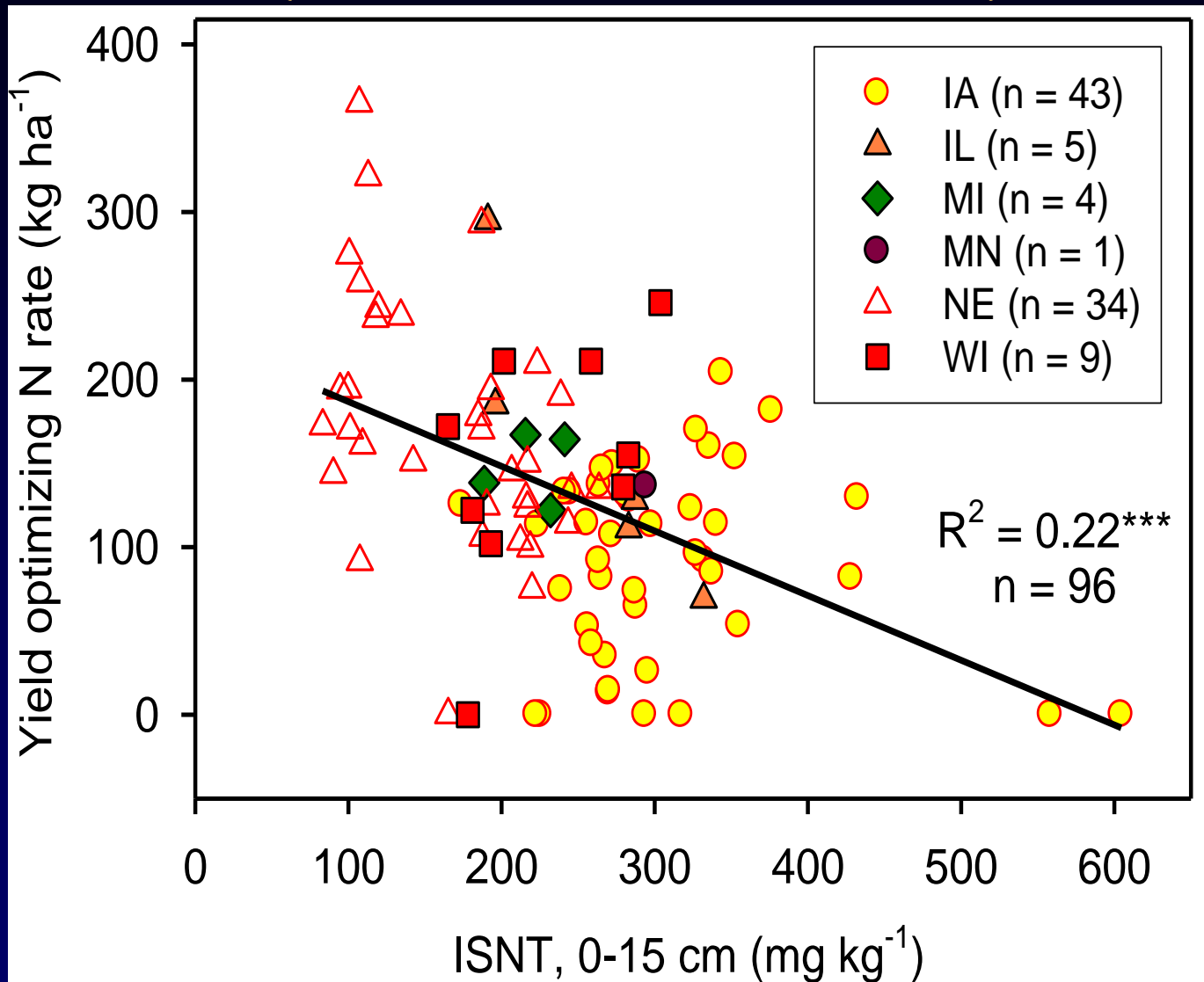
Results with the Illinois soil nitrogen test in Wisconsin



Relationship Between the Illinois N Soil Test (Spring 0-12 Inch Depth Samples) and Economic N Rate (10:1 Corn:N ratio)

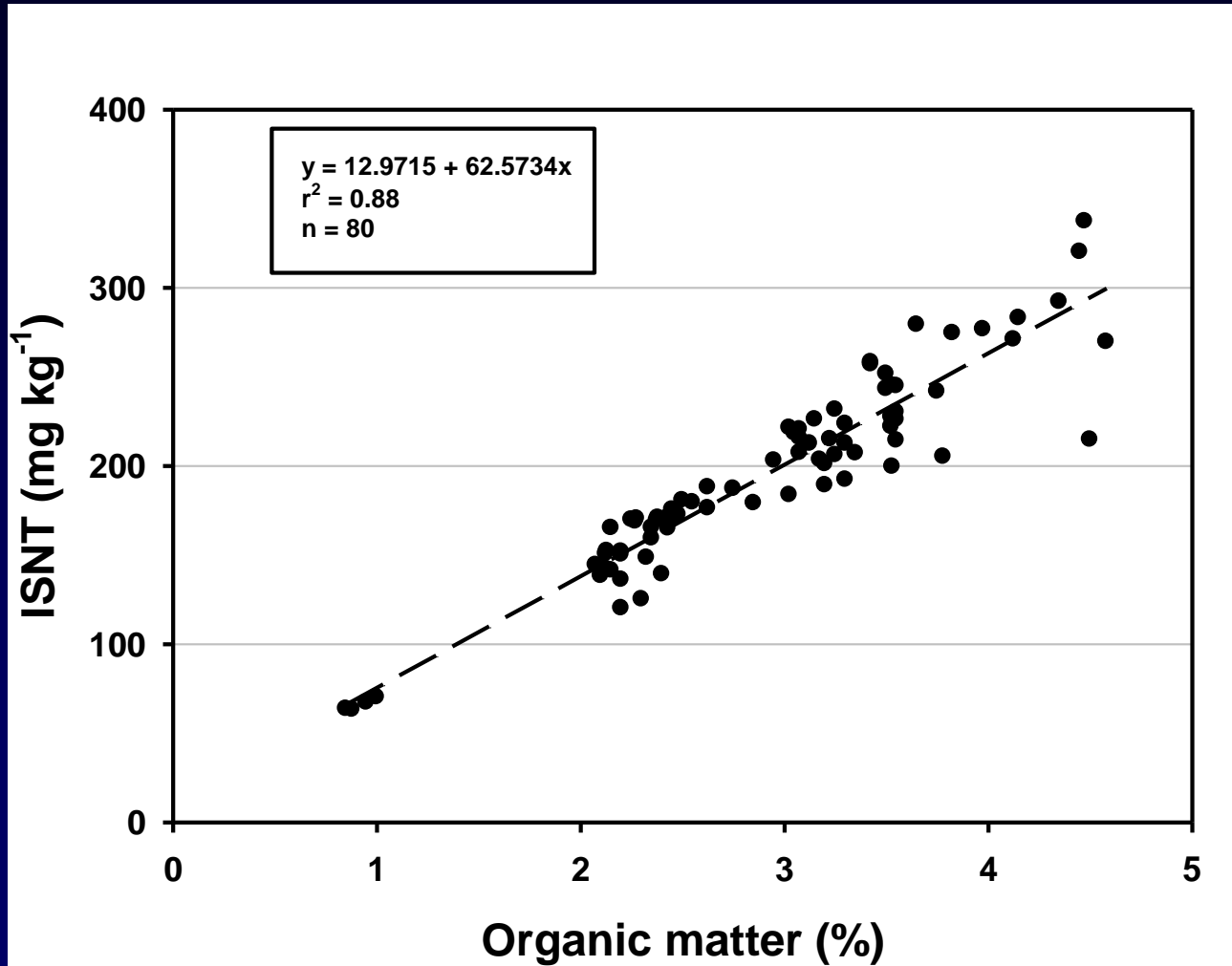


Regional ISNT vs. YONR (Laboski et al., 2006)



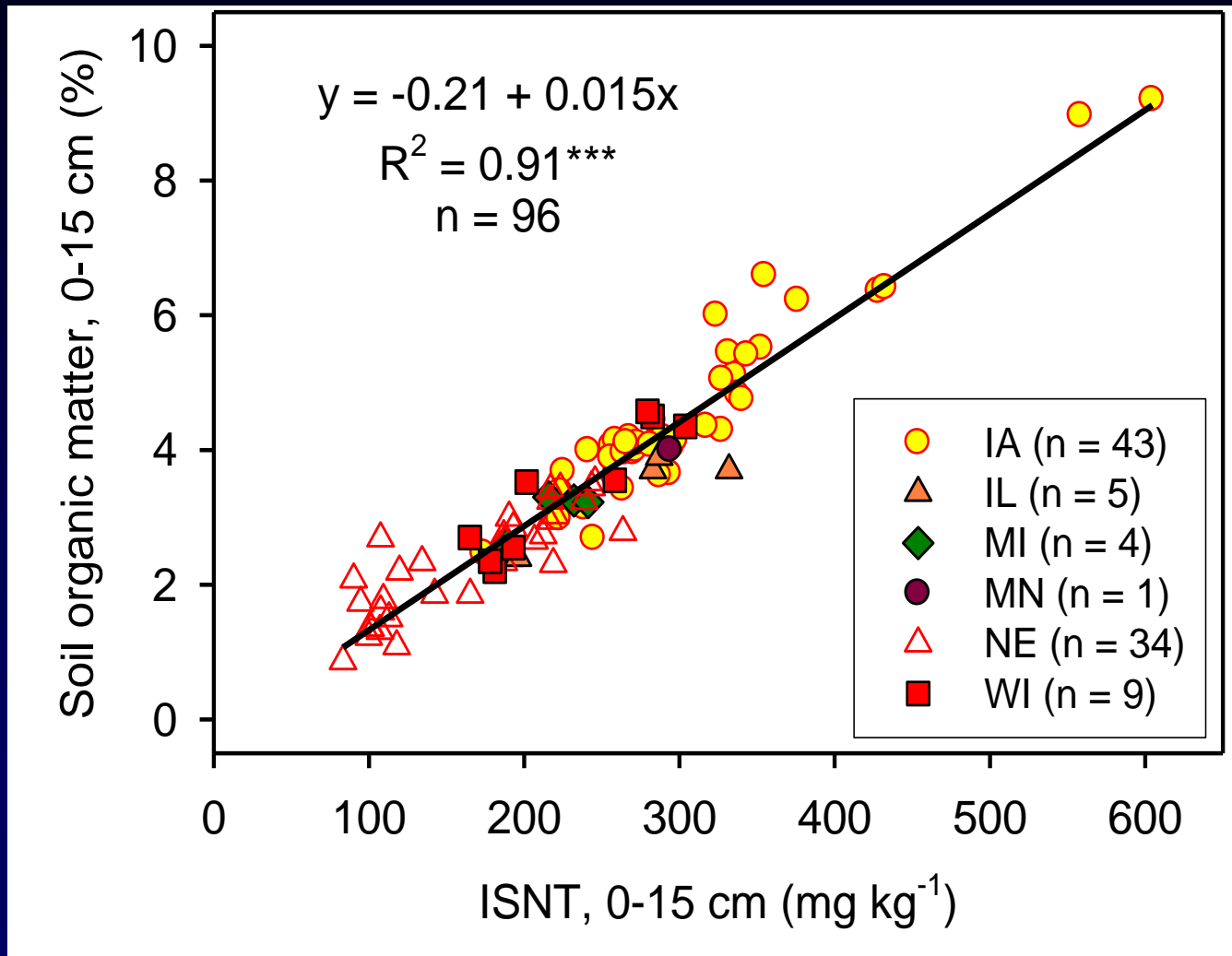
*** Statistically significant at the 0.001 probability level

Relationship of ISNT to soil organic matter - Wisconsin



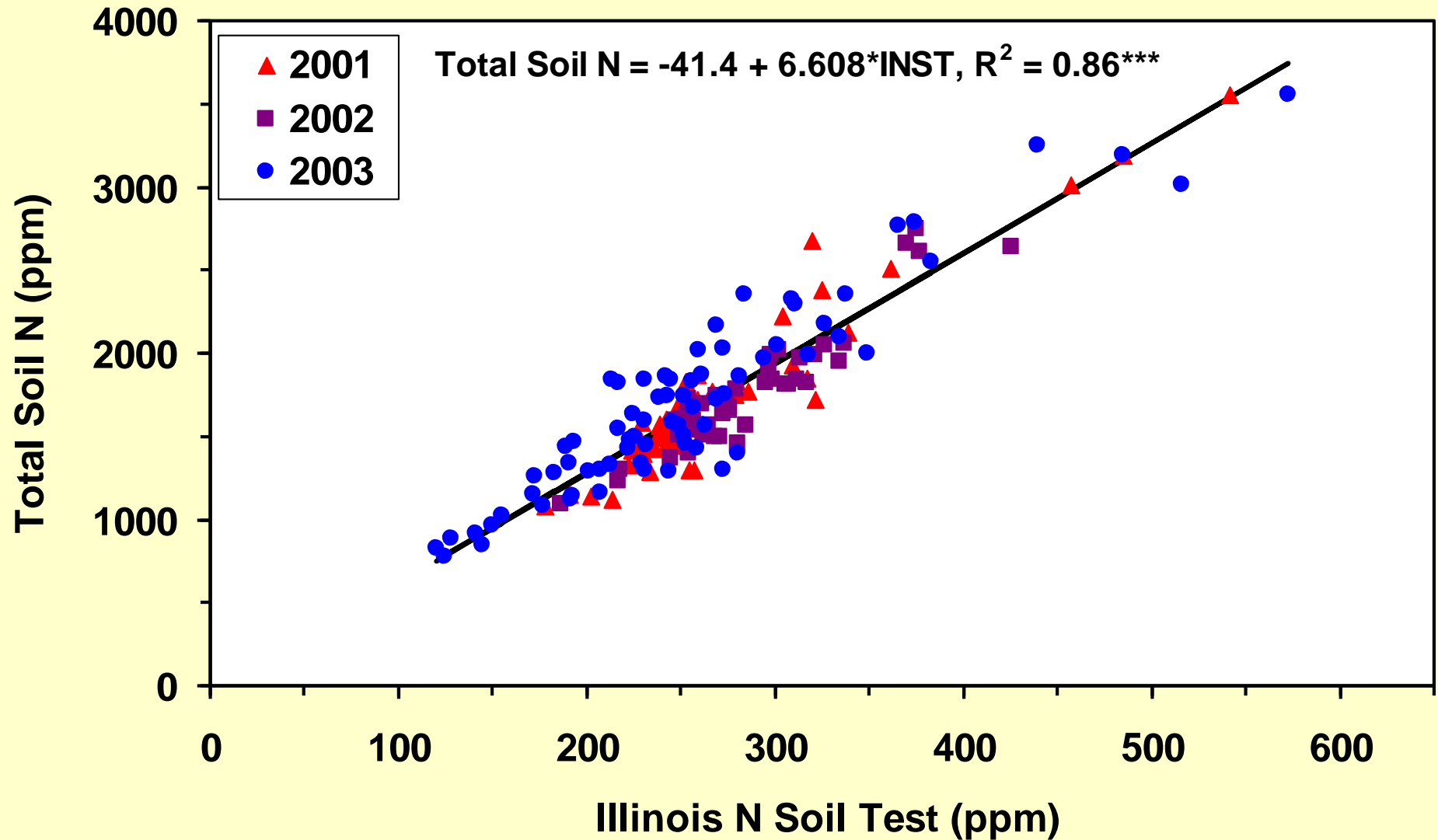
Regional ISNT vs. SOM

(Laboski et al., 2006)



*** Statistically significant at the 0.001 probability level

Illinois N Soil Test and Total Soil N (Spring or Fall 0-12 Inch Depth Samples)



Percentage of Soil Total N Measured by ISNT

Study	Location	% of Total N
Barker et al.	Iowa	15
Laboski et al.	7 states	14.7
Marriott & Wander	7 states	13.5
Osterhaus et al.	Wisconsin	12.6
Spargo et al.	Virginia	16.3

Conclusions

- The ISNT is not recommended in Wisconsin for predicting corn N needs or response.
 - Poor relationship with optimum N rates for corn (EONR)
 - Poor prediction of N response
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Conclusions

- ISNT is strongly correlated with soil organic matter and total N
 - Numerous studies indicate ISNT is measuring a constant fraction of soil total N rather than the available or readily mineralizable fraction of soil organic N
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