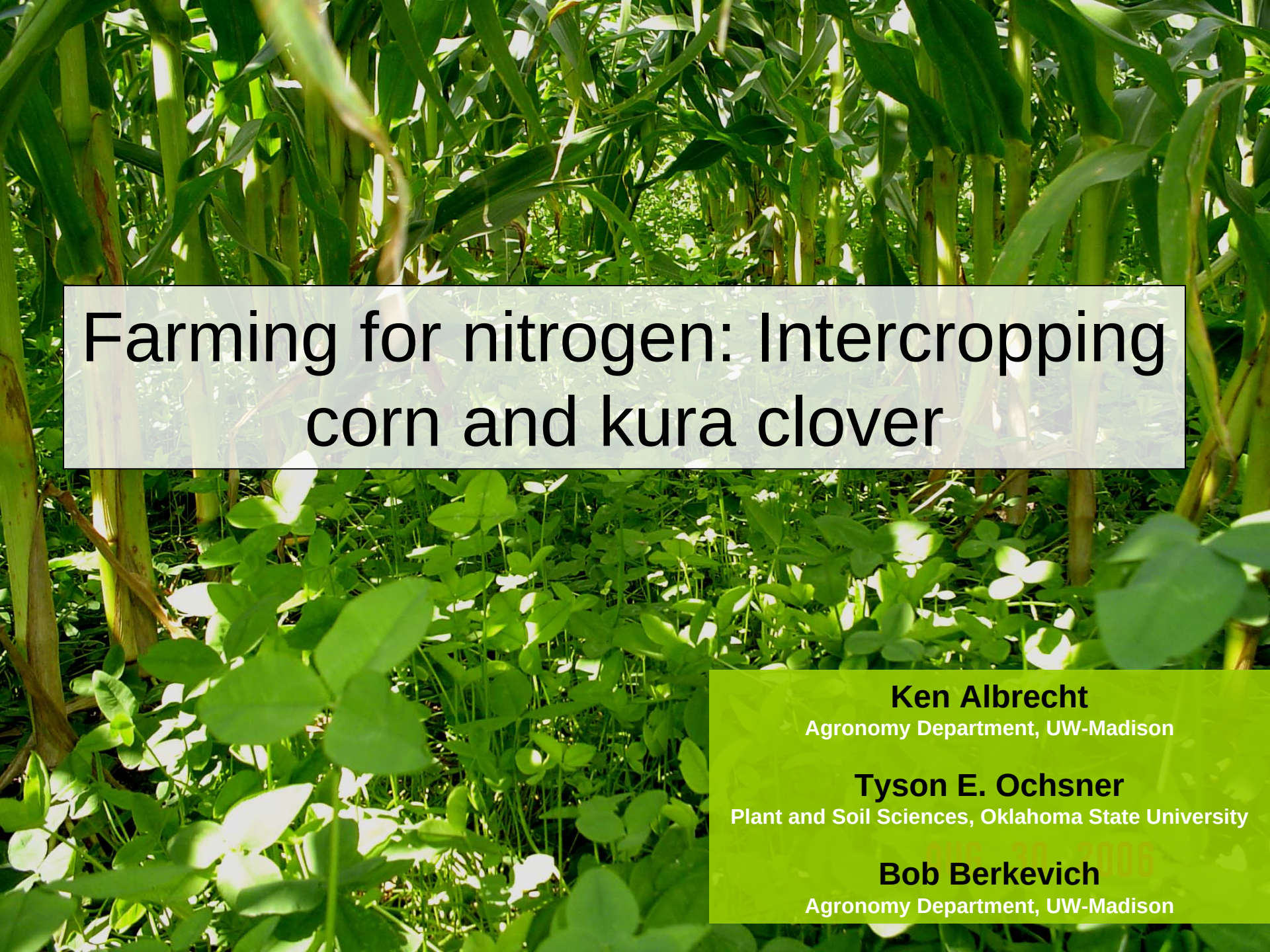

Farming for nitrogen: Intercropping corn and kura clover

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High N costs encourage us to maximize legume N credits.

Nitrogen fertilizer costs $0.70+ per pound and will increase as energy prices increase.

Des Moines Register
December 12, 2008

Study says cuts in pollution needed to shrink dead zone

By PHILIP BRASHER
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Washington, D.C. - Scientists are urging the government to start reducing pollution from Midwest farms that fouls local water supplies and helps create a large dead zone in the Gulf of Mexico.

(National Academy of Sciences)

NOTICE

High Levels of Nitrate in Drinking Water

This water supply has been found to contain high levels of nitrate that exceed federal and state drinking water standards.

DO NOT GIVE THE WATER TO INFANTS. Infants less than 6 months old who drink water containing high levels of nitrate could become seriously ill and, if untreated, may die. Water-based drinks and formula for children less than 6 months old should not be prepared with water from this establishment. Bottled water or other water low in nitrates should be used instead.

Some studies suggest that unborn children of pregnant women may also be at risk. Therefore, PREGNANT WOMEN should not drink this water.

DO NOT BOIL THE WATER. Boiling concentrates the nitrate and increases the hazard. Filtering, freezing, or letting the water stand does not reduce the nitrate level.

Healthy adults and children over 6 months old can drink the tap water. However, if you have specific health concerns, you may wish to consult with your doctor.

A brochure providing additional information on nitrate in drinking water is available from the owner of this establishment, from the Wisconsin Department of Natural Resources, or from the Wisconsin Department of Health and Family Services.

If you have additional concerns or questions, please contact the owner of this establishment.

12/07/2007


Roles of legume living mulch
in corn production systems

Questions:

- Can corn be grown in perennial legume living mulch?
- What is the N fertilizer replacement value of kura clover living mulch for corn production?
- Does living mulch reduce soil erosion?
- Does living mulch reduce nitrate movement into ground water?
- What is the role of legume living mulch in the new bioeconomy?

Kura clover (*Trifolium ambiguum cv.* Endura)


Can corn be grown in kura clover living mulch?


1st suppression, April 18
Bands killed, April 25
Corn planted, April 25
May 1, 2006

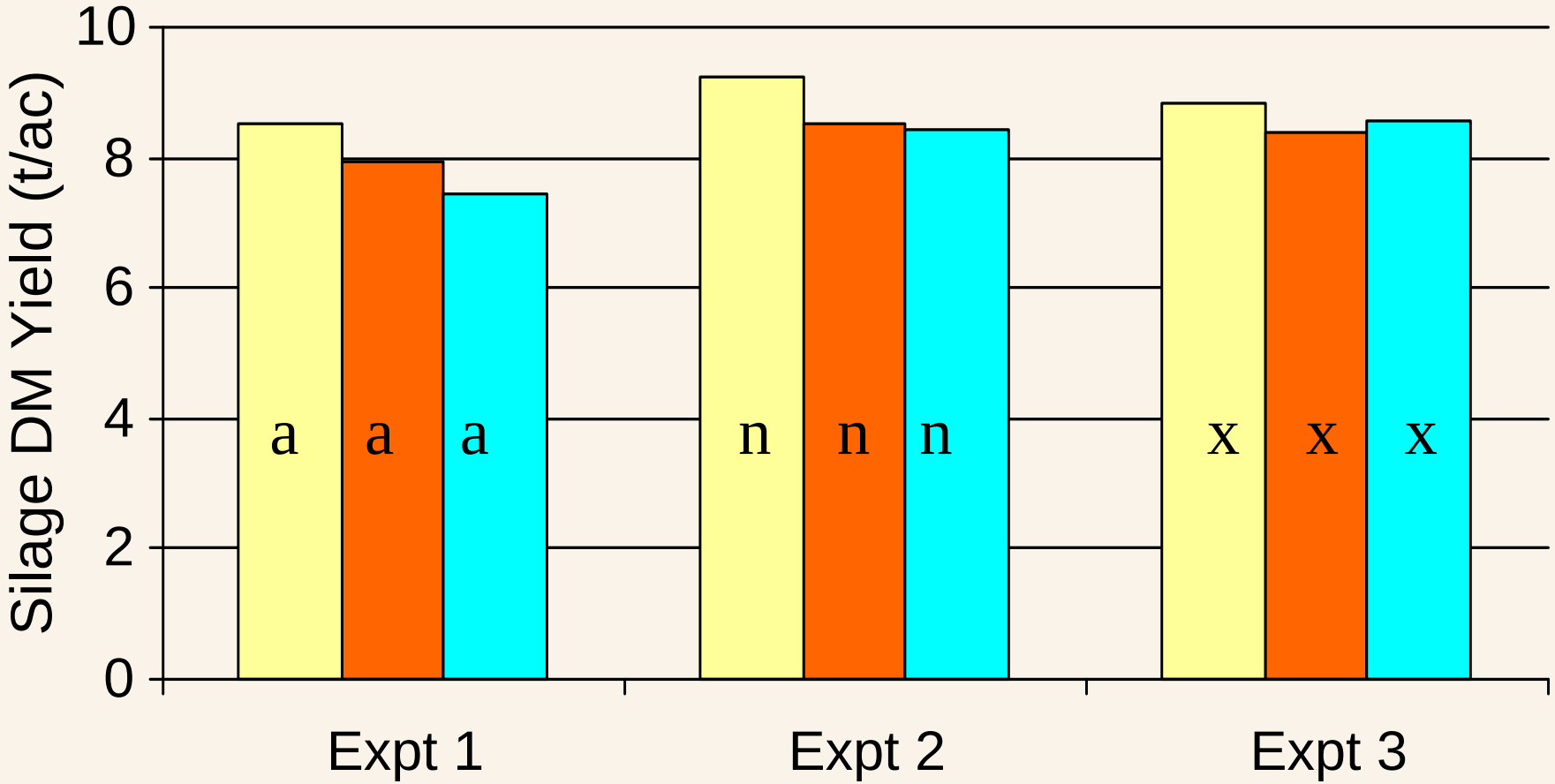

2nd suppression, May 31
Sidedress N, June 6
June 20, 2006


August 30, 2006


August 30, 2006


October 12, 2006

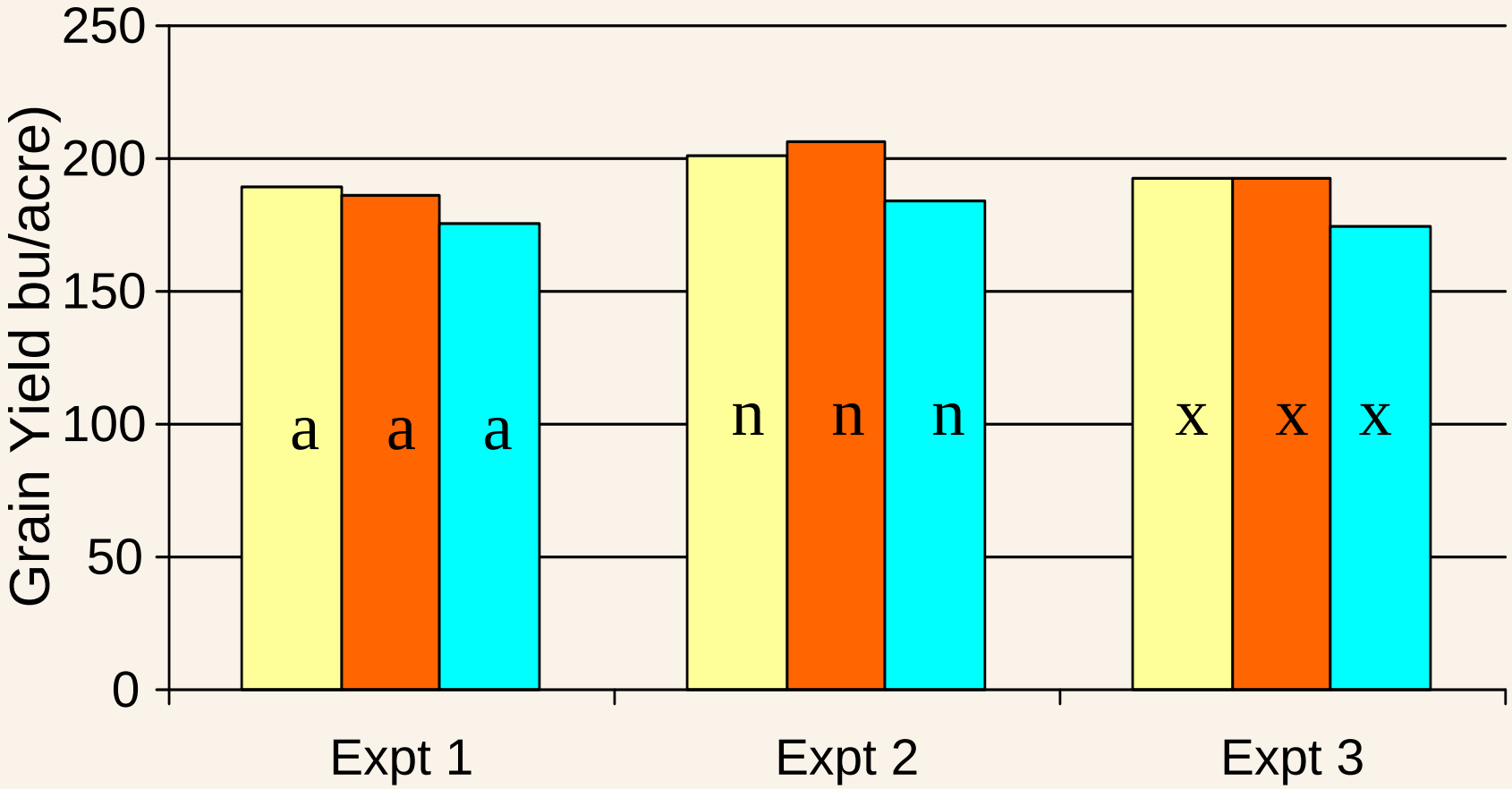
Corn silage yield in kura clover living mulch.



P = 0.05

Affeldt and Albrecht

Corn grain yield in kura clover living mulch.



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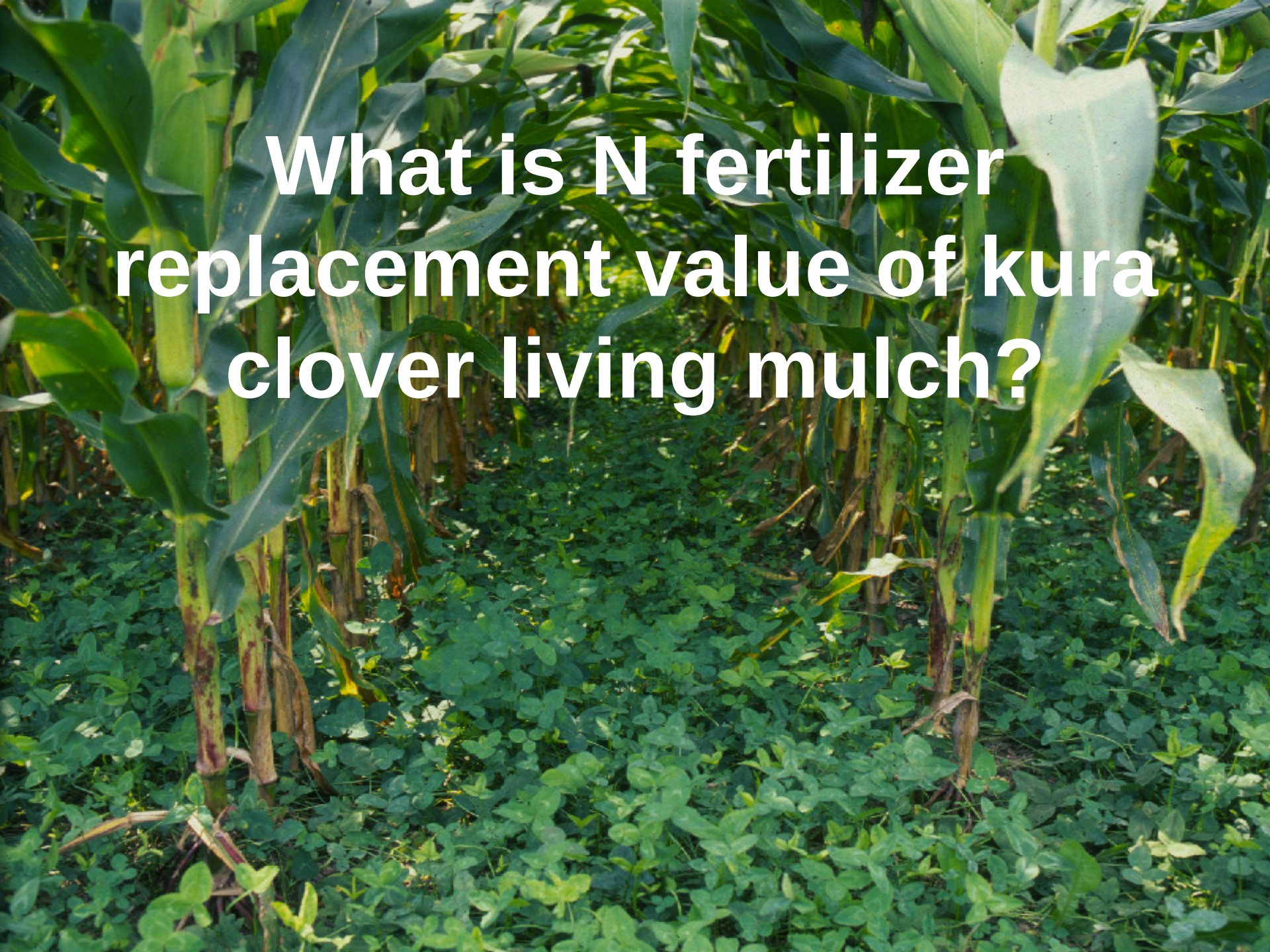
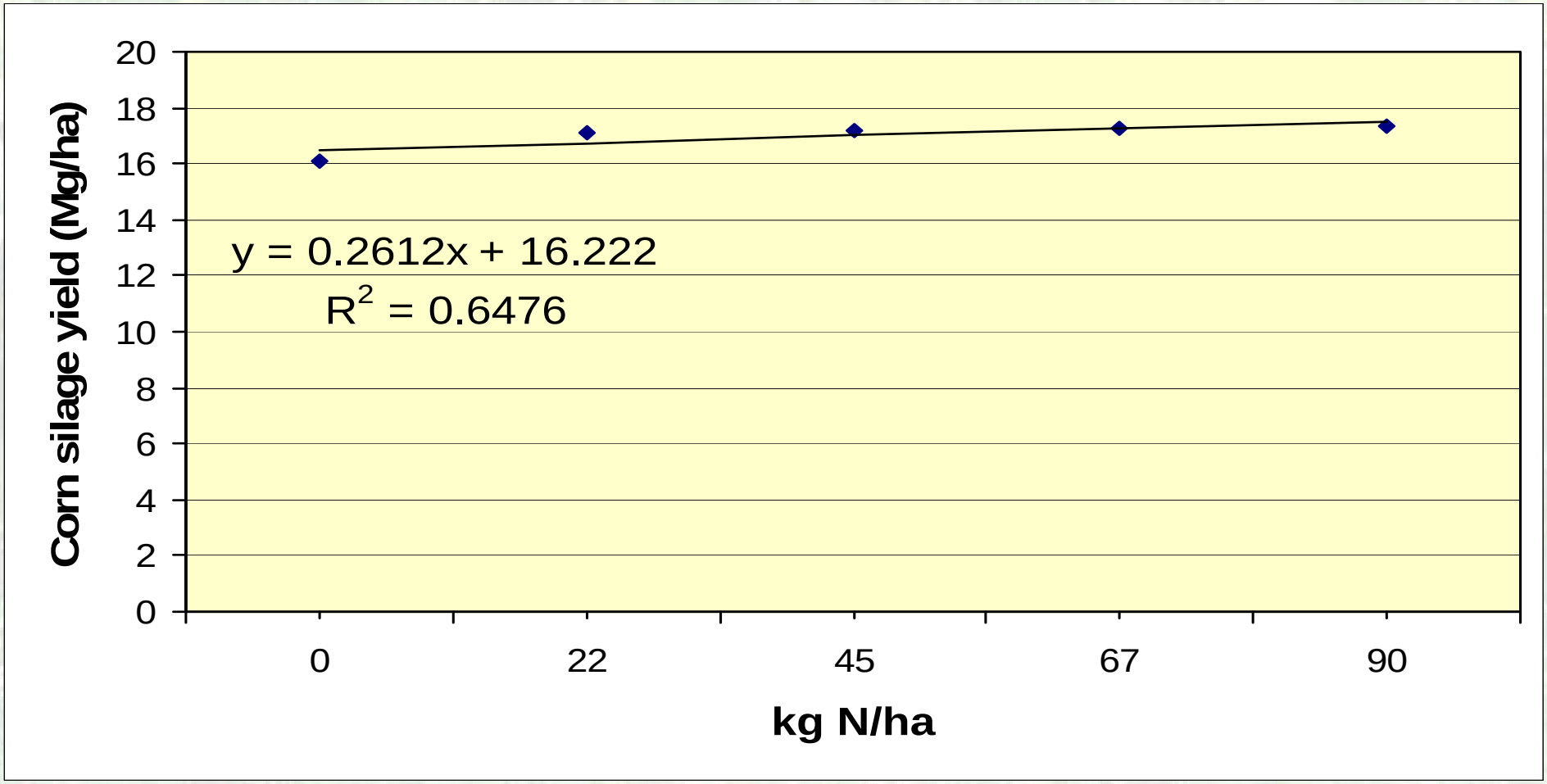
Affeldt and Albrecht


What is N fertilizer replacement value of kura clover living mulch?

Corn silage dry matter yield response to N fertilizer in kura clover living mulch (data are pooled over four environments).



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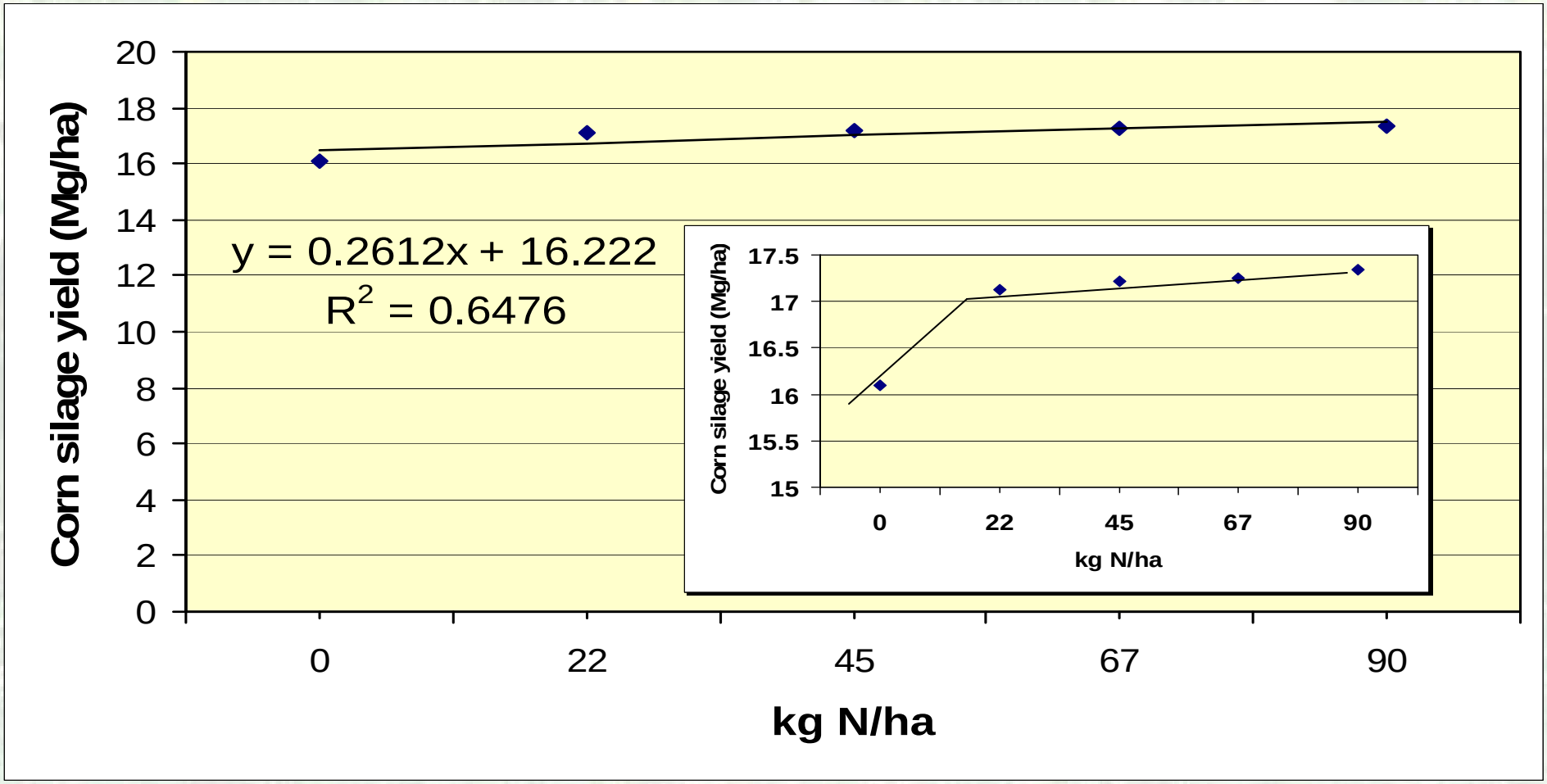

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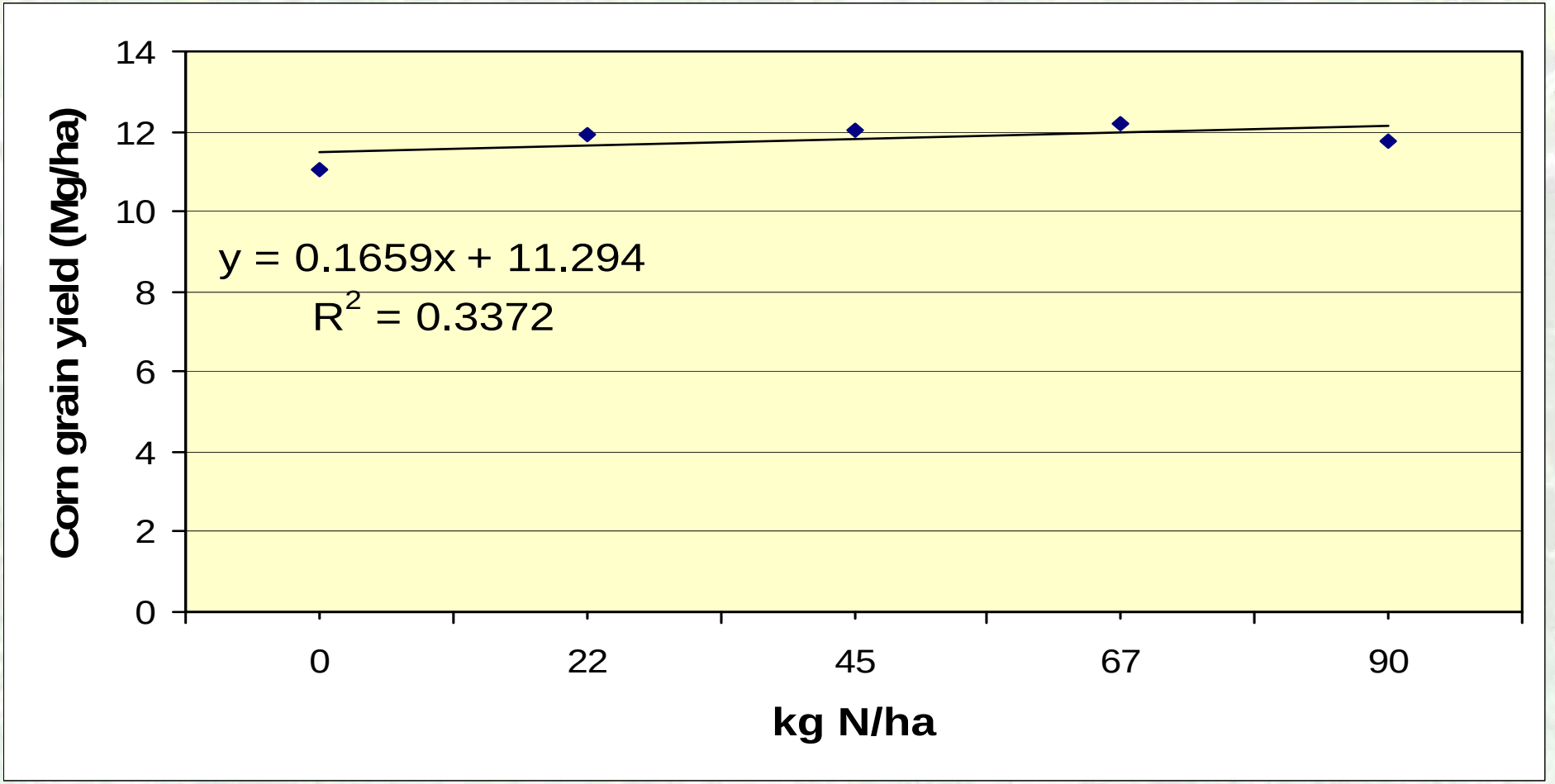

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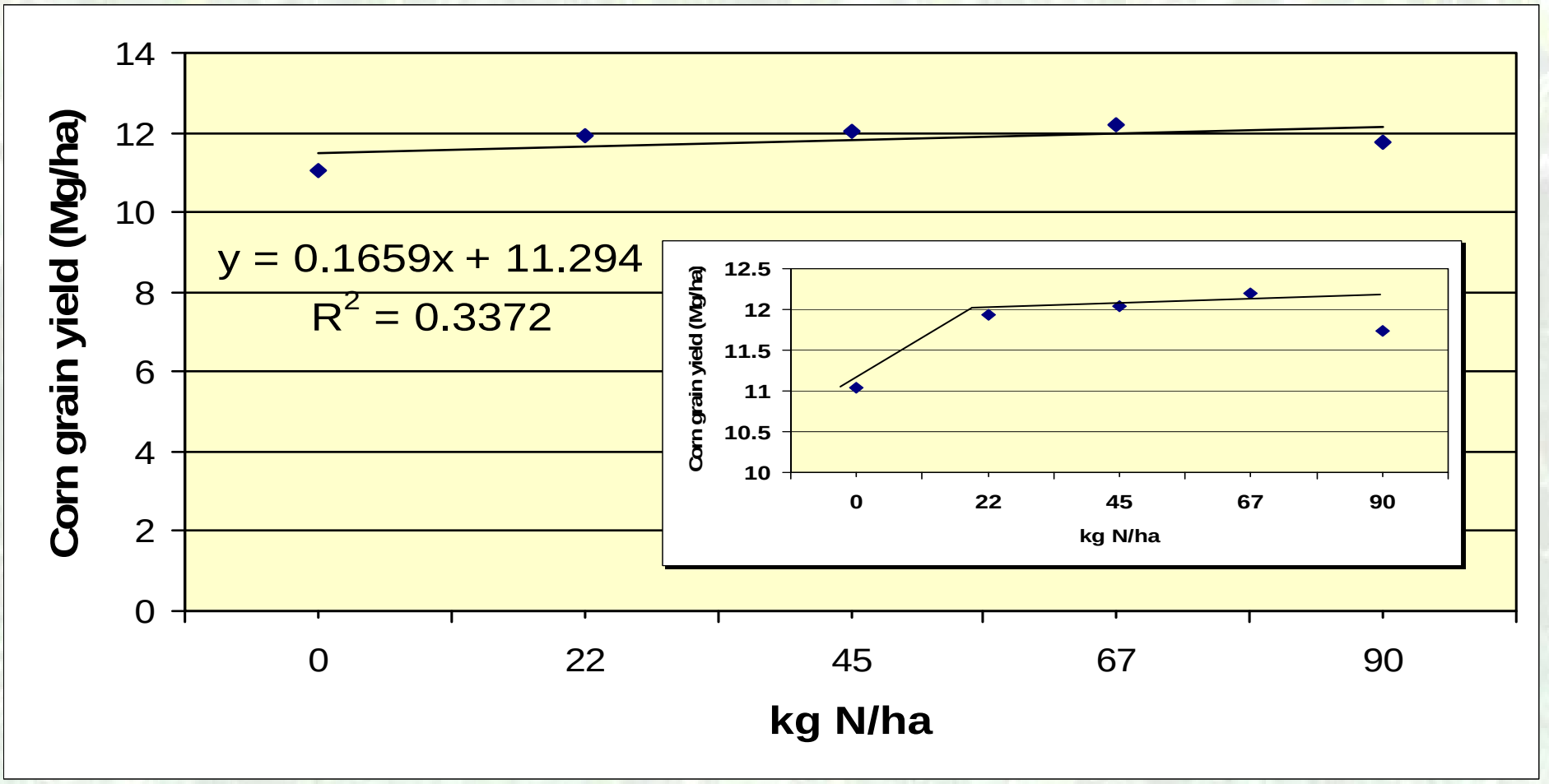


Does kura clover living mulch reduce soil erosion?

Sediment and runoff delivery from conventional and living mulch corn production systems.

Sample date	Sediment delivery (lbs./acre)		Runoff delivery (gal./acre)	
	Tilled	Mulch	Tilled	Mulch
July 27	85	4	4,700	4,500
Aug. 3	93	11	4,100	3,000
Sept. 11	76	7	4,100	3,500

Slope was 6 to 8%.

Does living mulch reduce nitrate leaching to groundwater and tile lines?

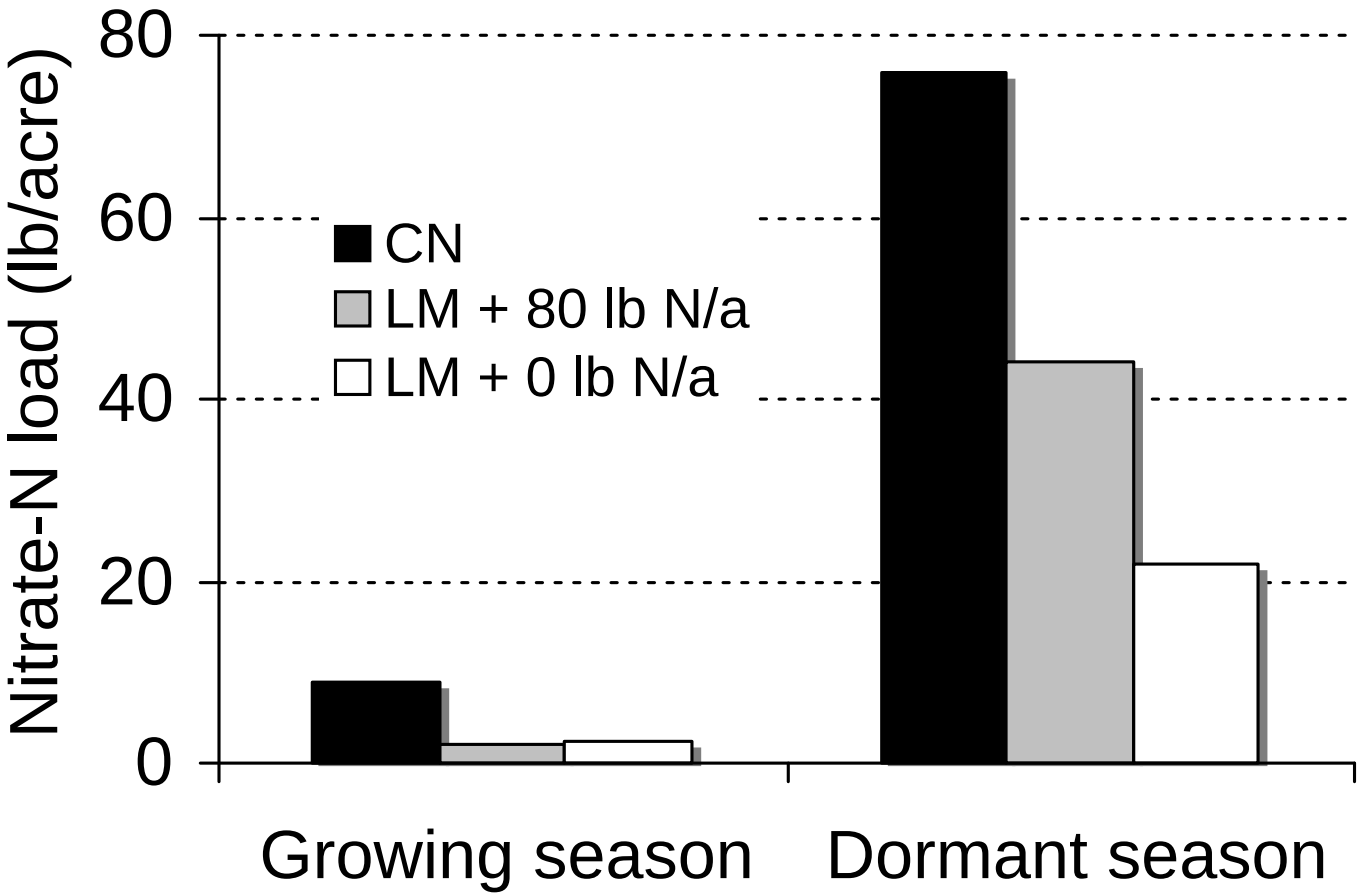
Flow-weighted nitrate-N in leachate

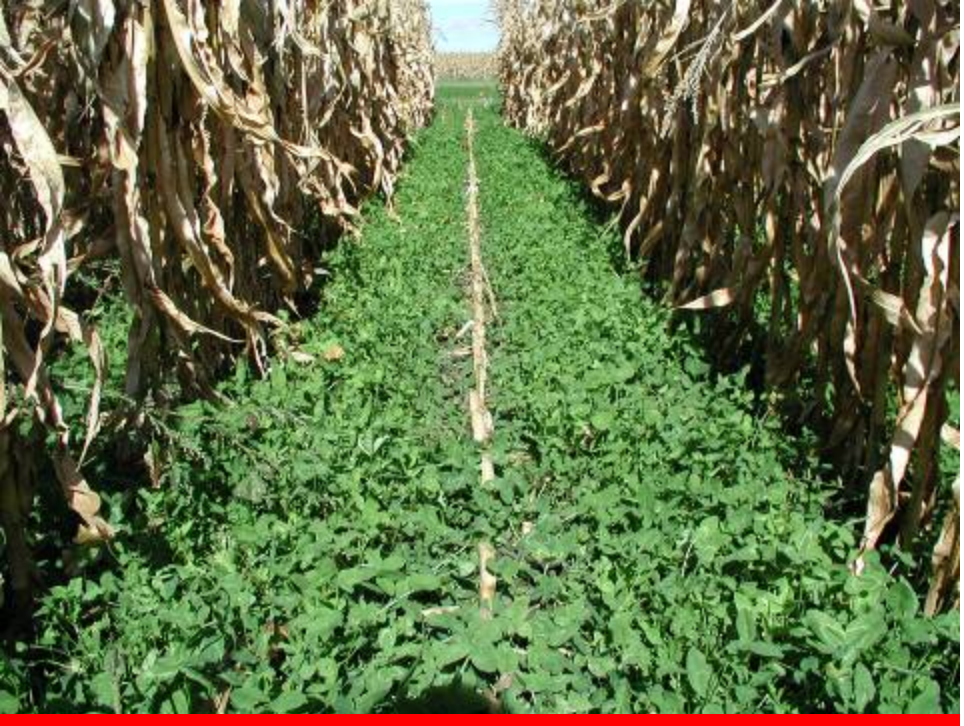
- ~50% lower nitrate concentrations under corn grown in living mulch with 80 lb ac^{-1} yr^{-1} added N
- ~75% lower nitrate concentrations under corn grown in living mulch with no added N
- For corn in living mulch with no added N, leachate below drinking water standard

Season	CN +80 N	LM + 80 N	LM + 0 N
		ppm	
Grow	7.5	3.9	4.5
Dorm	28.0	13.8	6.3

Growing season = April 1 through Sept. 30
Dormant season = Oct. 1 through March 31

Nitrate-N leached below 40 inch depth





- Nitrate leaching load under corn was reduced 50 to 75% by the presence of kura clover living mulch.
- Load reduction was a result of both reduced nitrate concentration and reduced drainage.

Role of intercropping in Bioeconomy?

Corn stover as biofuel feedstock

244 million tons produced in the US annually
15 to 24 billion gallons of ethanol (NREL)
$10/acre extra profit for farmers (NREL)

Soil erosion
Nutrient runoff
Soil organic matter
Nutrient removal

Can intercropping corn in a permanent legume stand mitigate anticipated problems associated with corn stover removal for biofuel feedstock?

Conclusions

- Corn can be grown in kura clover
- Most or all N requirements for corn production are met
- Soil erosion may be reduced
- Nitrate leaching is reduced
- Year-a-round ground cover may allow “safe” removal of stover for biofuel feedstock

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