

Crop and soil effects from stover harvest, cover crops, and tillage over 10 years in central Iowa

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Background

Harvesting corn stover for bio-products must balance economic, agronomic, soil protection, and environmental objectives.

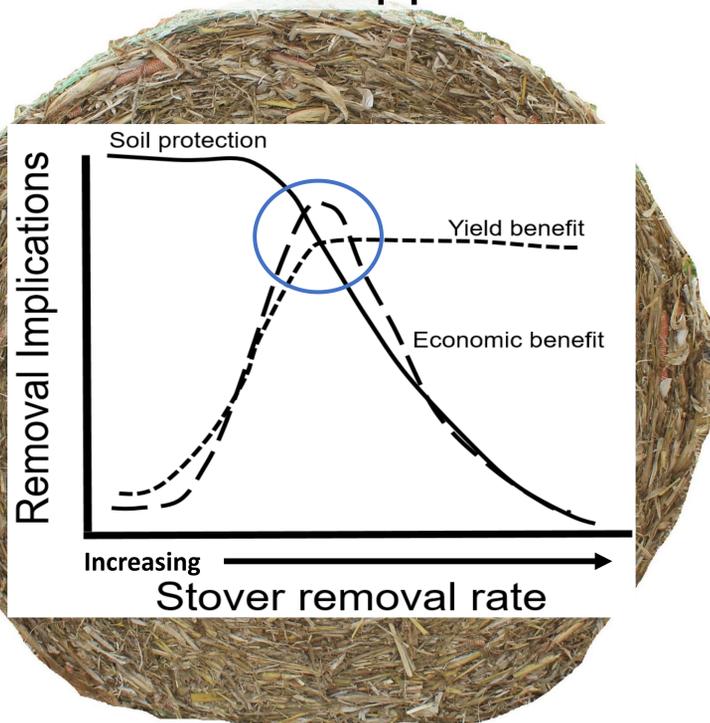
A long-term study in Boone County, Iowa evaluating combinations of tillage, stover removal, crop rotation, and cover crops is being used to identify suitable management systems meeting these objectives.

Data from this study contributes to our understanding of how soils change over time in response to soil and crop management.

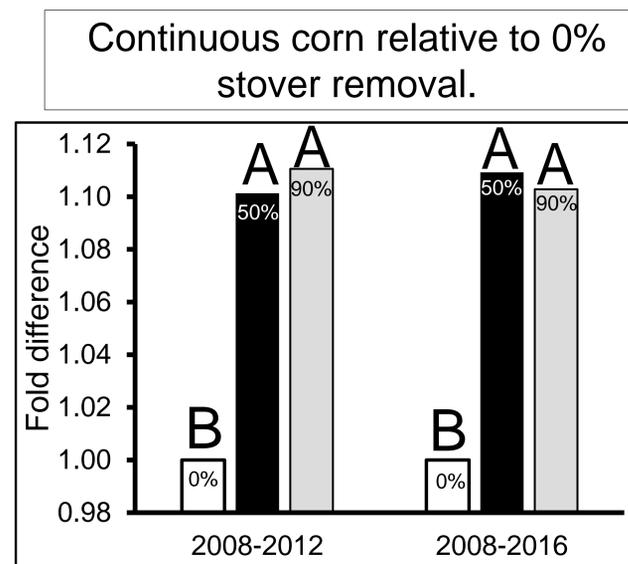
Key Findings

- Continuous corn yields averaged (10.8 Mg ha⁻¹) and were similar for moderate (3.5 Mg ha⁻¹) and high (5.3 Mg ha⁻¹) stover removal.
- A corn-soybean rotation with a rye cover crop harvested prior to planting soybean had the greatest economic return using ISU cost of production estimates.
- SMAF soil quality index scores were not reduced by stover removal, but POM, which is currently not scored in the SMAF, was reduced.
- Overall, moderate stover removal in rotated systems with cover crops appears to be the most sustainable production system.

Theoretical Approach

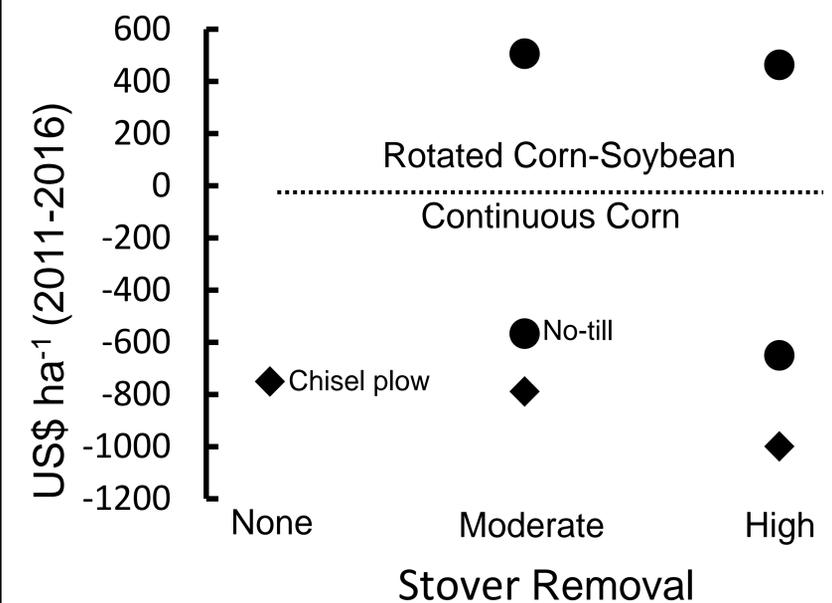


Cumulative Yield



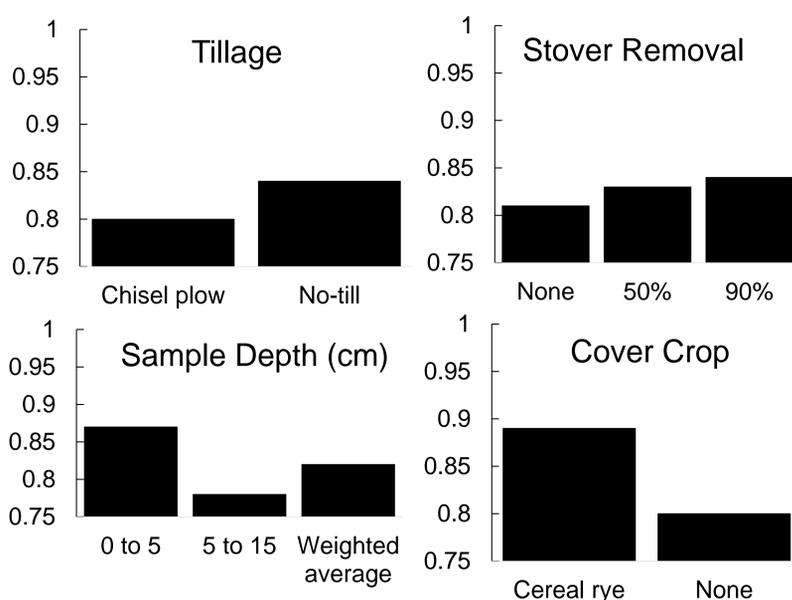
Letters p<0.05 within time period.

Estimated Economic Returns

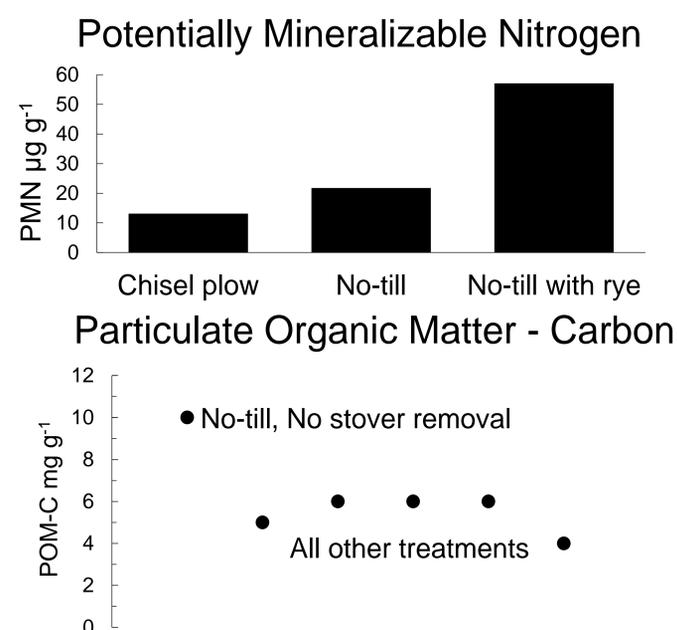


*Crop insurance programs not included.

Soil Health (SMAF) Scores



Key Soil Effects



Conclusions

Moderate stover harvest plus a cover crop is most sustainable

Additional indicators (e.g. POM) will greatly improve the SMAF

Acknowledgements

Photo taken by Gary Radke, USDA ARS NLAE. Obrycki is an ORISE Fellow. ORISE is managed by ORAU under DOE contract number DE-SC0014664. All opinions expressed are the author's and do not necessarily reflect the policies and views of USDA, ARS, DOE, or ORAU/ORISE.

Questions?

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