

# Effect of Cover Crop Composition on Nitrogen Requirement in Corn and Soybean



SOUTH DAKOTA STATE UNIVERSITY

Srinadh Kodali, Jason Clark, Shannon Osborne, Peter Sexton, Peter Kovacs  
 South Dakota State University, USDA-ARS Brookings, SD

- Cover Crop composition
- Yield vs. N rates
- Nitrate N

## Introduction

Cover crops can play a vital role in enhancing productivity of row crops by improving soil physical, chemical and biological properties.

Conventional tillage → No-till + Cover crops

Use of cover crops can.....

- ↑ soil quality
- ↓ Env degradation form fertilizer losses
- Aid in greater water and nutrient holding capacity.
- Affect the uptake of essential nutrients by corn and soybean.
- Cover crop mixtures vary in C:N ratio that may influence decomposition and subsequent mineralization of N for the following corn crop.

## Objectives

- Determining the effect of different, interseeded cover crop mixtures on corn and soybean yield.
- Evaluating the influence of different, interseeded cover crop mixtures on corn N fertilizer requirement.

## Methods

- Corn - Soybean rotation
- 3 cover crop treatments
- Treatments inter seeded into V7 development stage of corn and V5 developmental stage in soybean.



## Study sites

- Research sites were in Brookings and Beresford, SD
- Both sites in no-till >5 years and varied in mean annual temperature and precipitation.

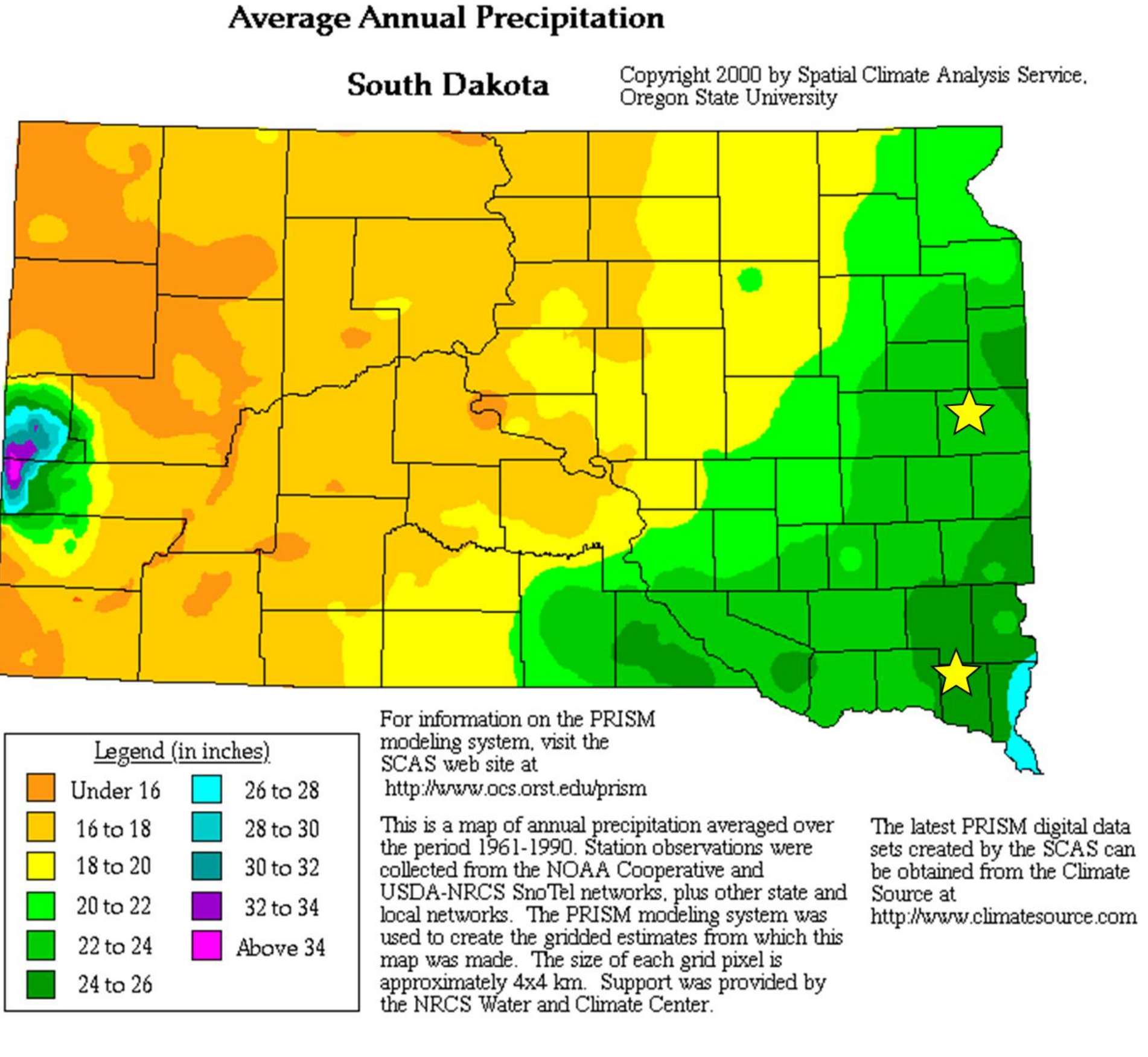


Figure 1. Average Annual Precipitation in SD

## Can cover crop composition influence N requirement in corn and soybean yield ?

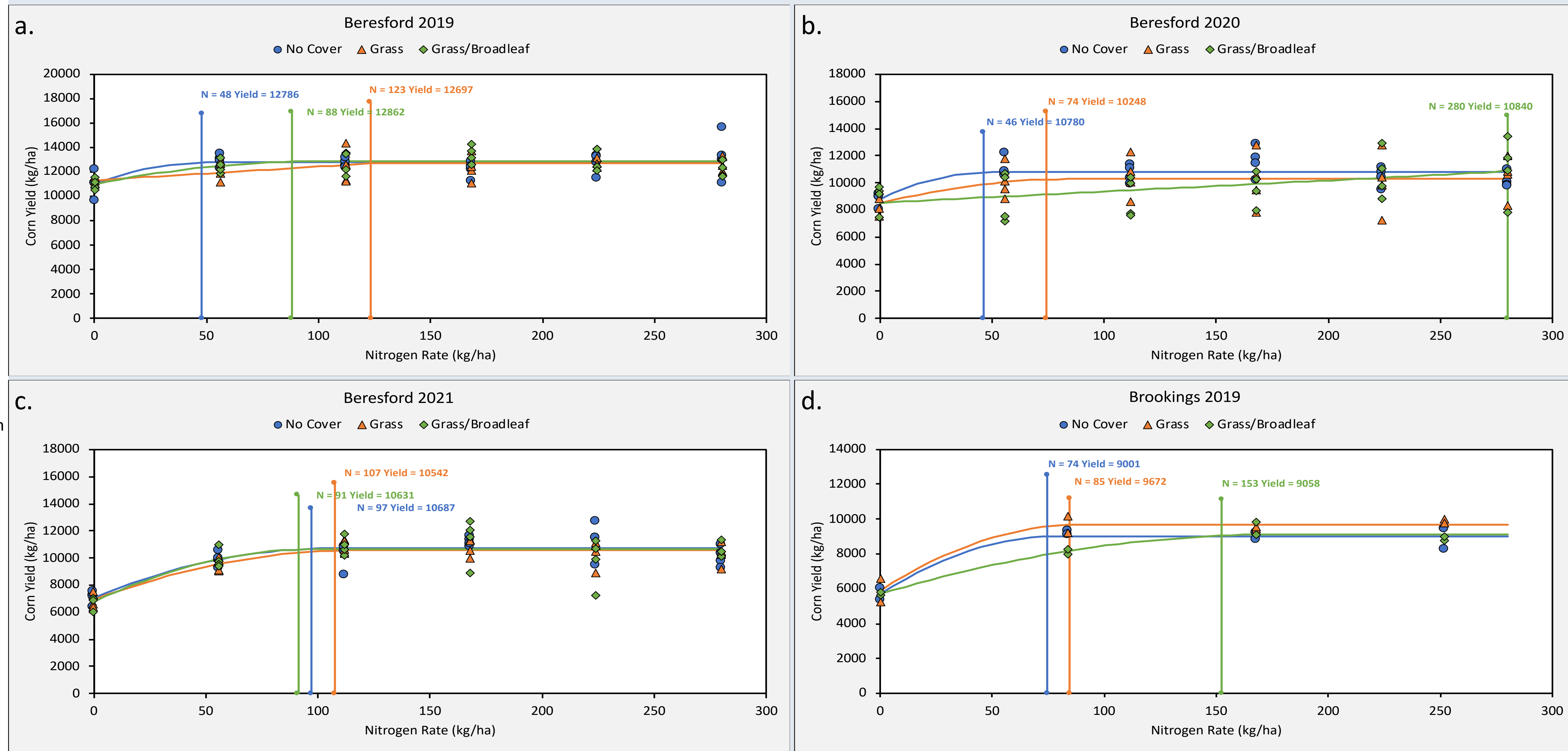


Figure 2 (a-d). Response curves comparing yield and N fertilizer required to optimize corn yield.

- In 3 of 4 site years, corn with grass/broadleaf cover crop required 10, 70, and 110 kg/ha more N than corn with grass or no cover crop.
- Corn with grass cover crop compared to no cover crop required anywhere from 46 less to 30 kg N/ha more.
- In 2 of 4 N responsive site-years at EONR of grass cover crop, corn with grass/broadleaf cover crop yielded 1,200-1,900 kg/ha less than corn with grass or no cover crop.

## Yield vs N rate

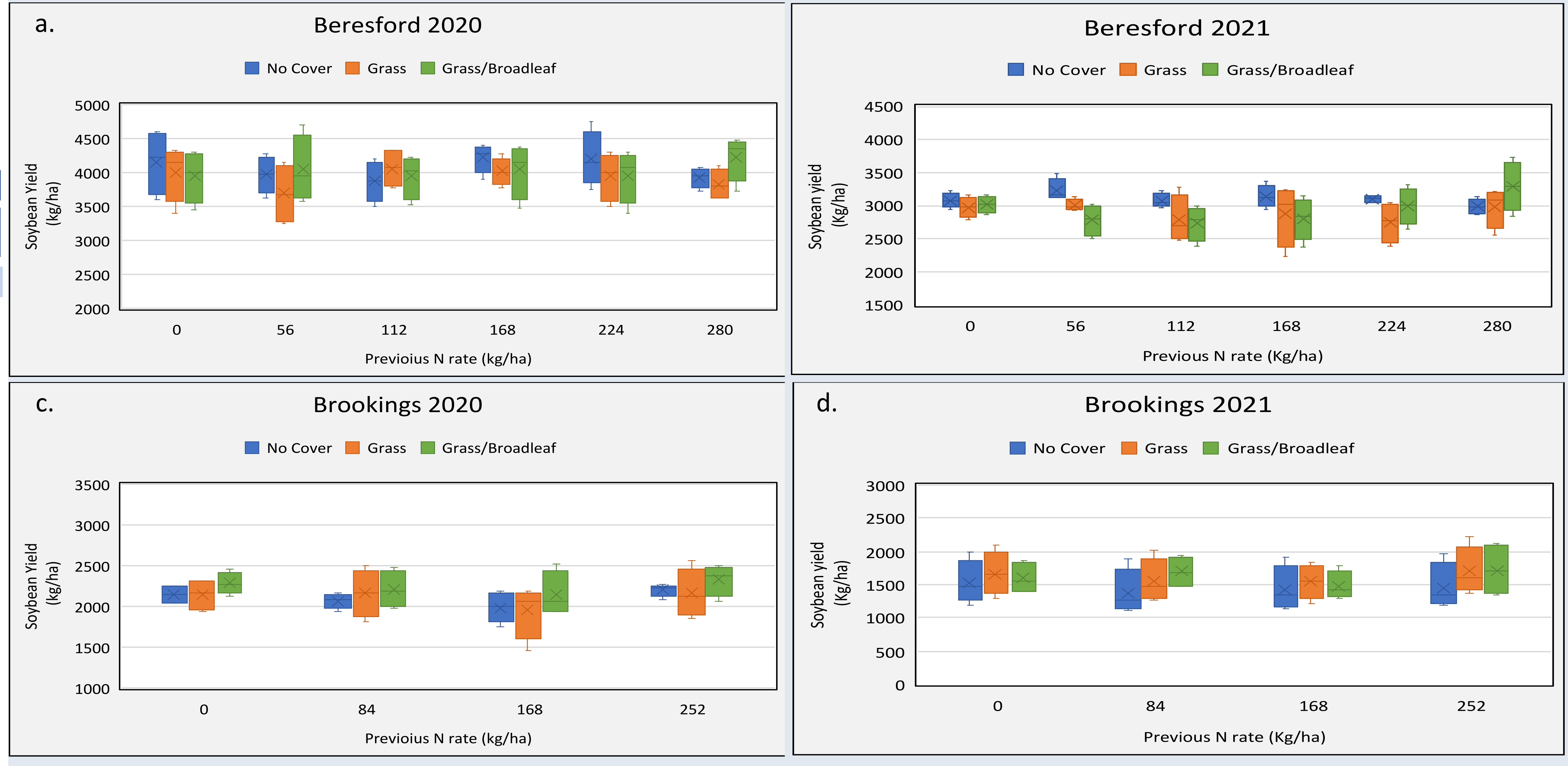


Figure 3 (a-d). Soybean yield as a function of cover crop treatment and Previous N rate

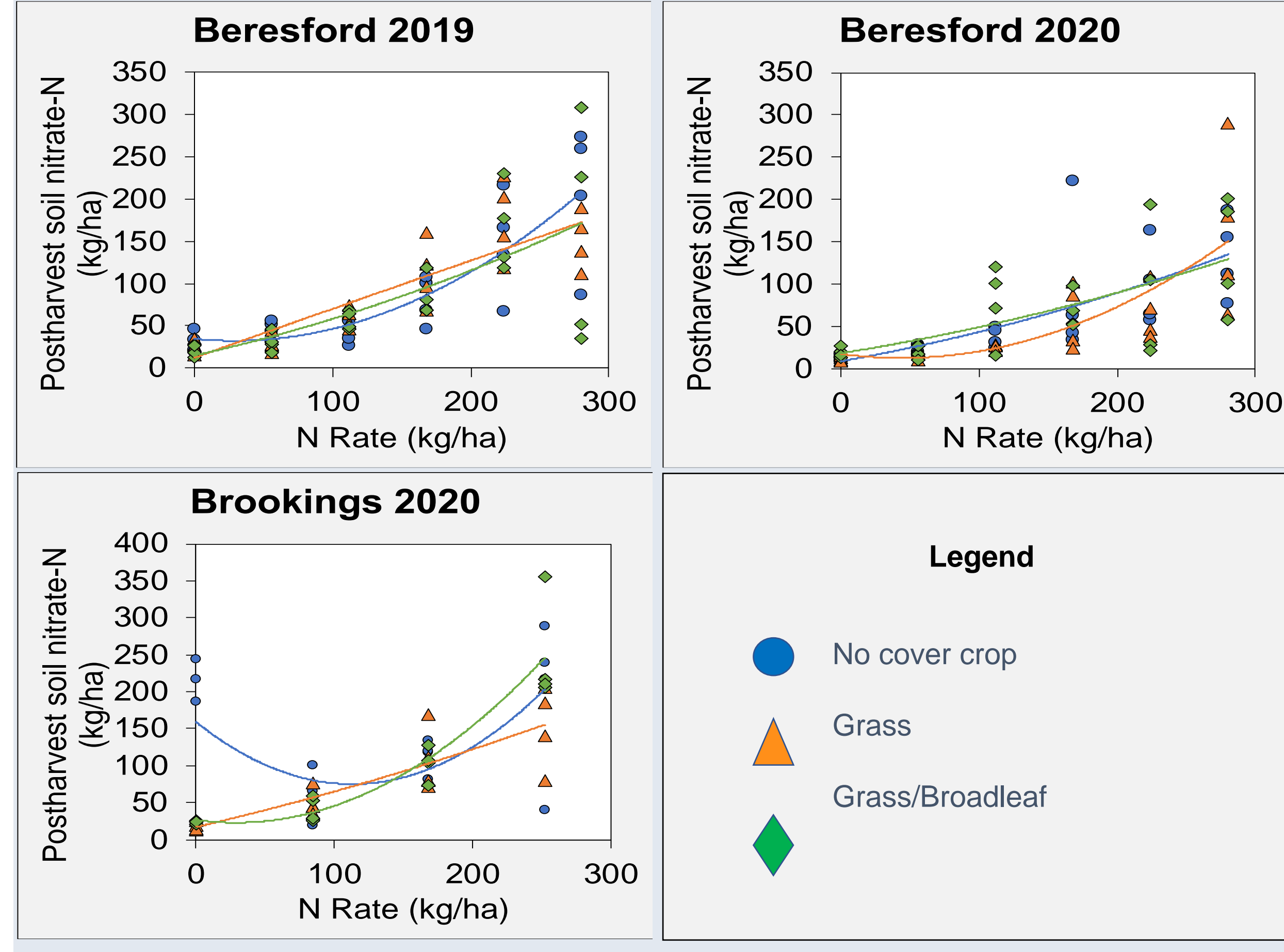


Figure 4 (a-d). Post harvest soil nitrate N as a function of treatment N rate

Cover crop presence and composition minimally influenced soybean yield.

- No clear influence of inter seeded cover crops on lessening post corn harvest soil nitrate-N.



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