Building Soil Carbon with Kernza® Intermediate Wheatgrass

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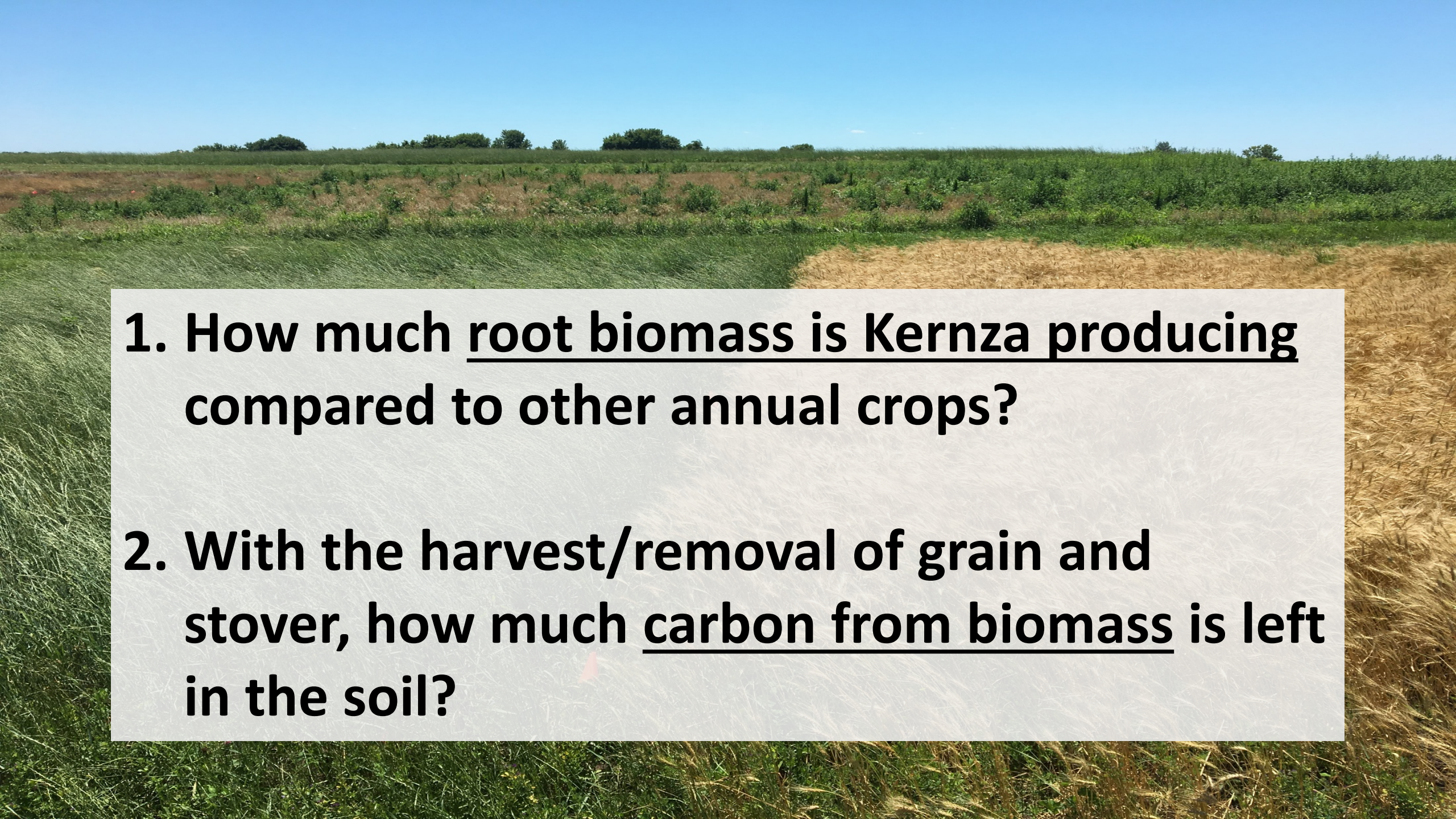
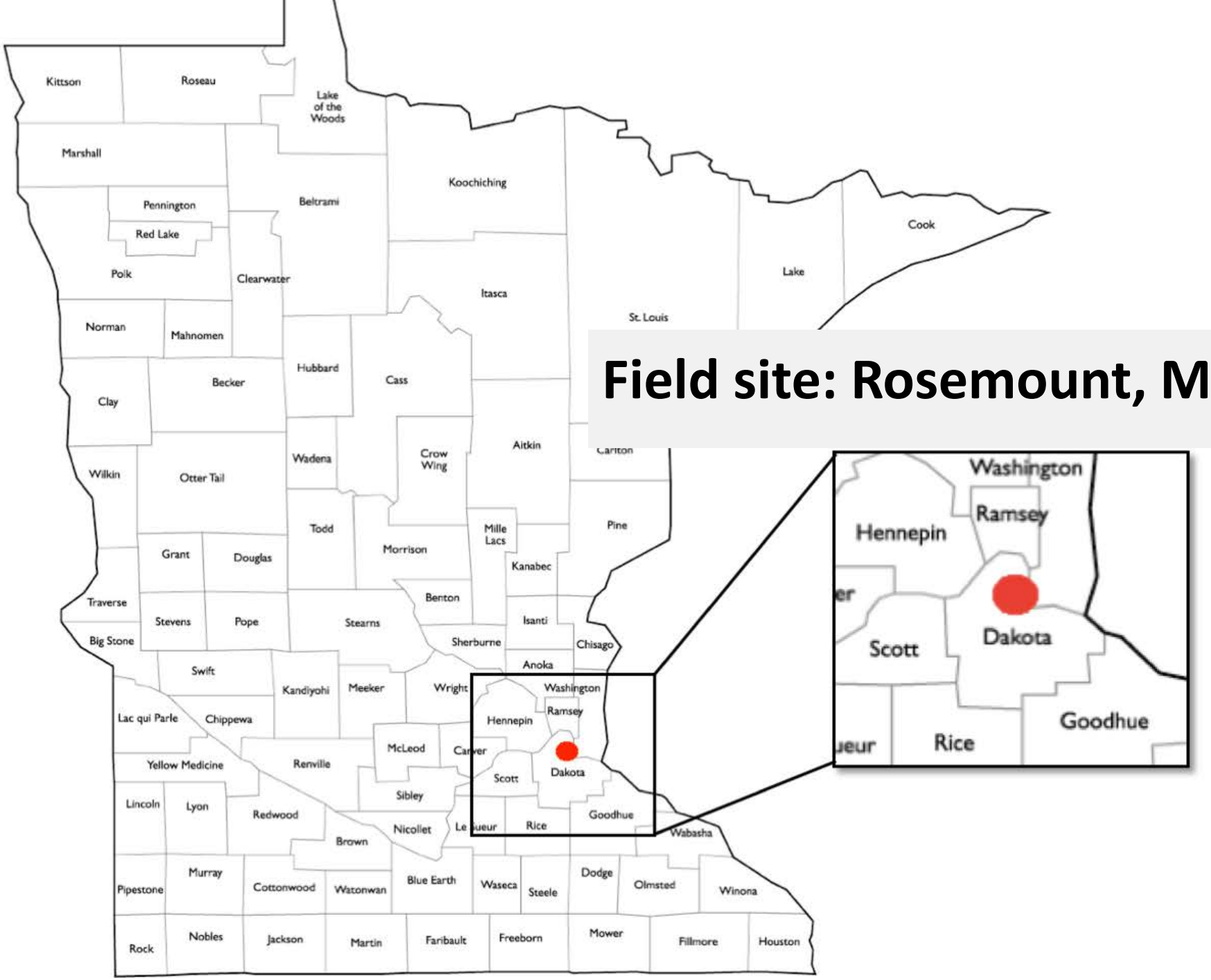


1. How much root biomass is Kernza producing compared to other annual crops?

2. With the harvest/removal of grain and stover, how much carbon from biomass is left in the soil?

Methods:
Study Area

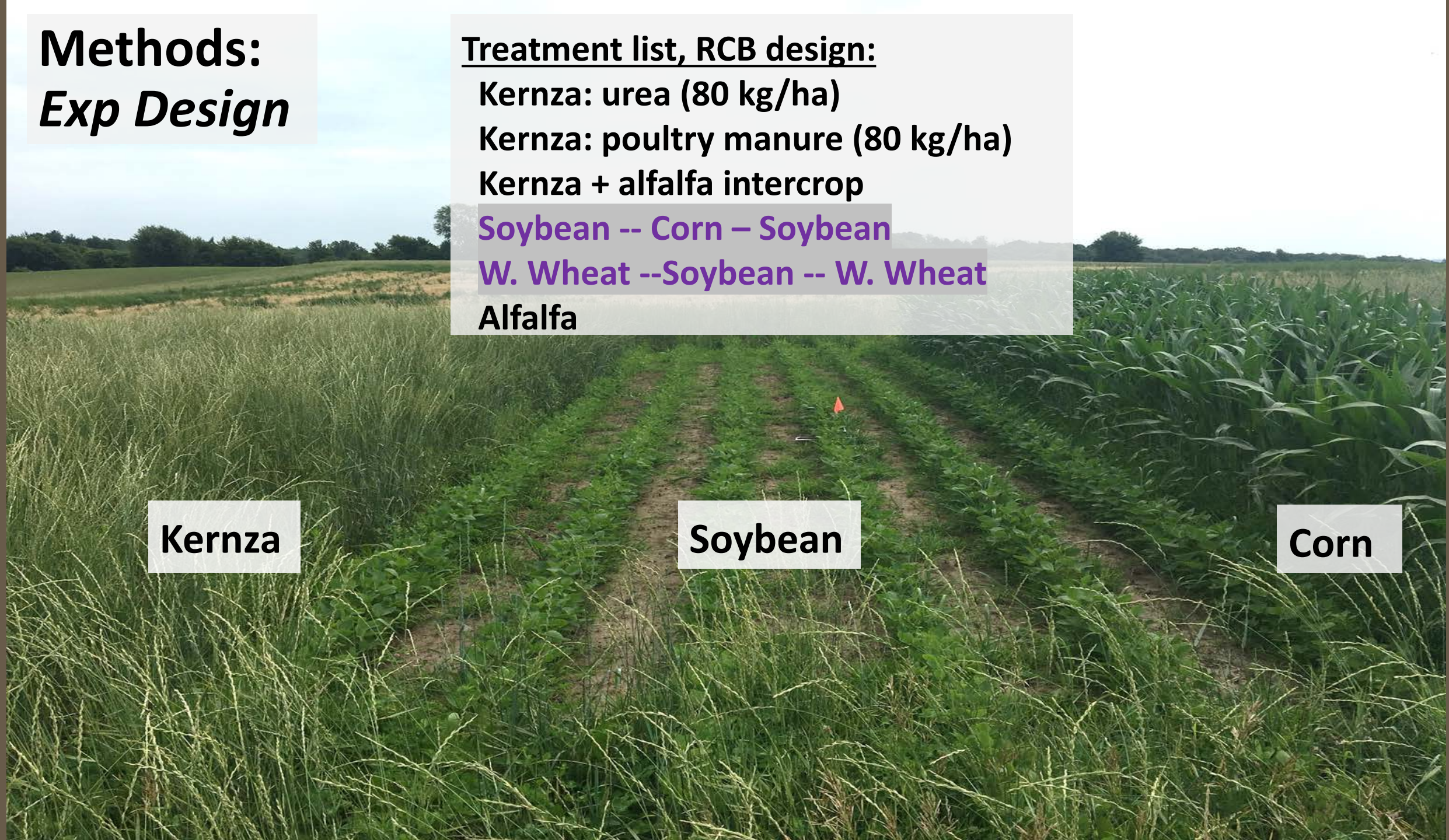


Field site: Rosemount, MN

Methods:
Exp Design

Treatment list, RCB design:

- Kernza: urea (80 kg/ha)
- Kernza: poultry manure (80 kg/ha)
- Kernza + alfalfa intercrop
- Soybean -- Corn – Soybean
- W. Wheat --Soybean -- W. Wheat
- Alfalfa



Methods: *Timeline*

2016

Fall

Alfalfa, Kernza

2017

Spring

Wheat, Soybean

Fresh soil 0-15 cm
(microbial biomass)

Peak biomass,
grain harvest

Fall

Soil and Roots 0-60 cm

2018

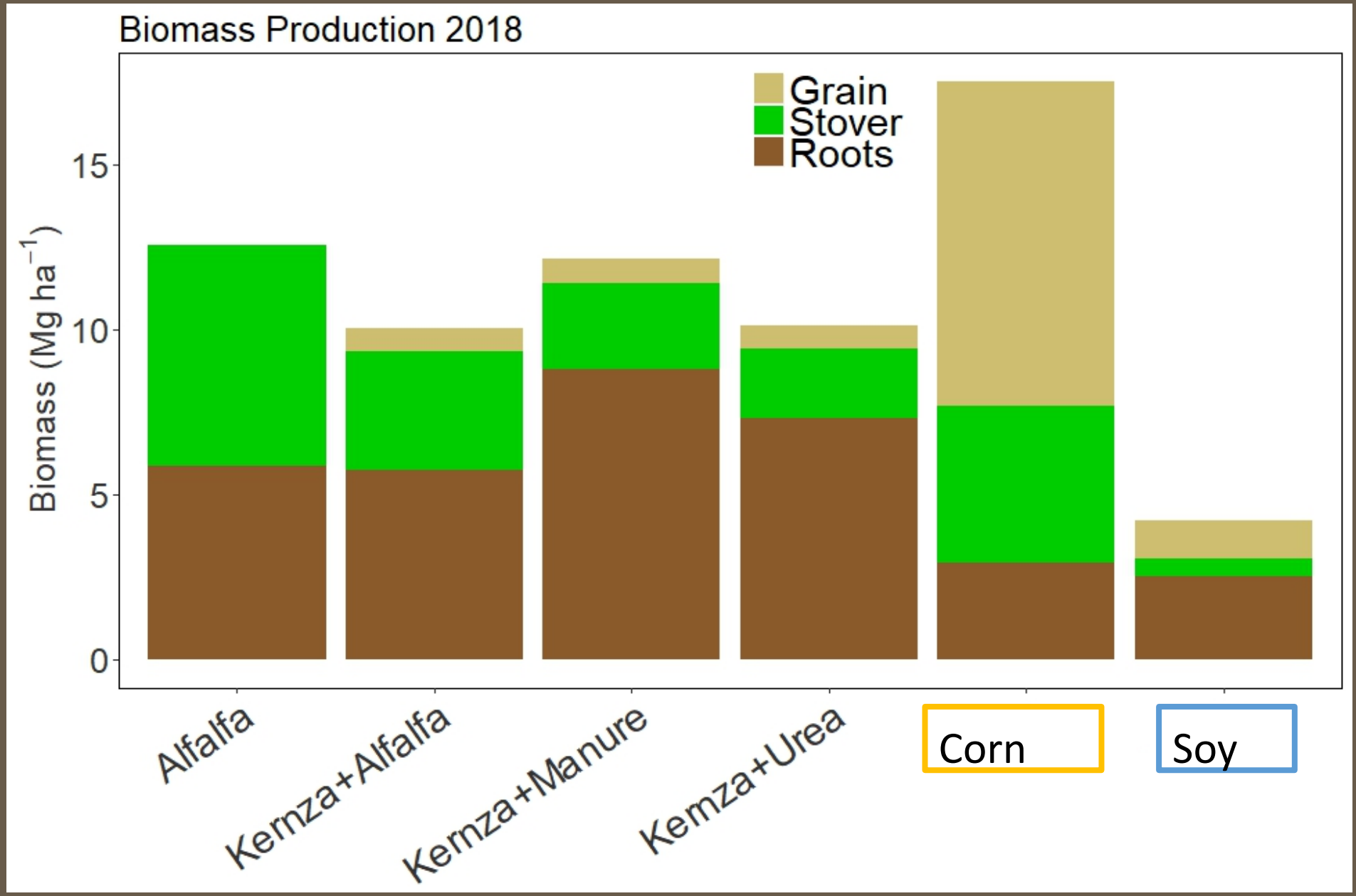
Spring

Corn, Soybean

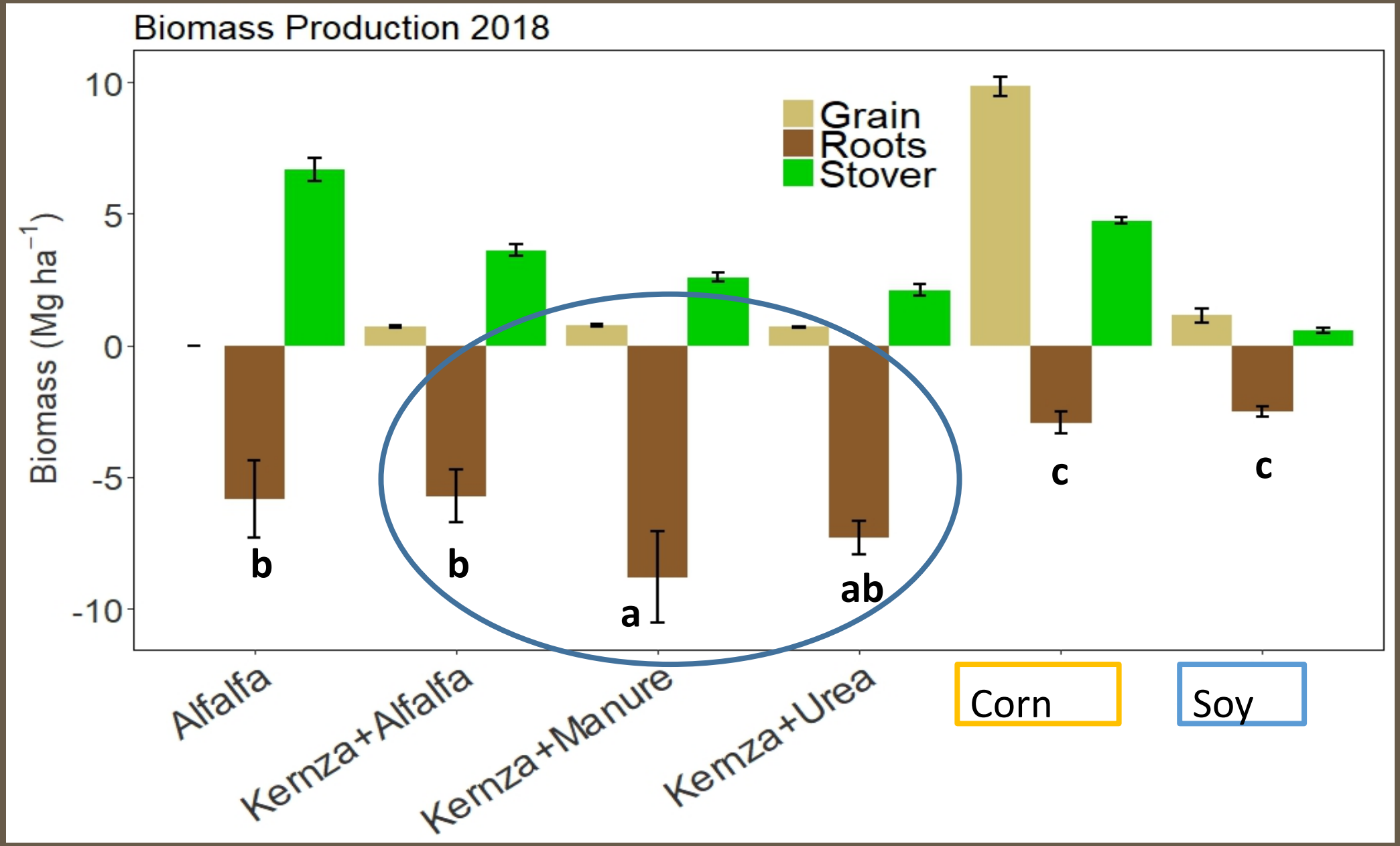
Peak biomass,
grain harvest

Fall

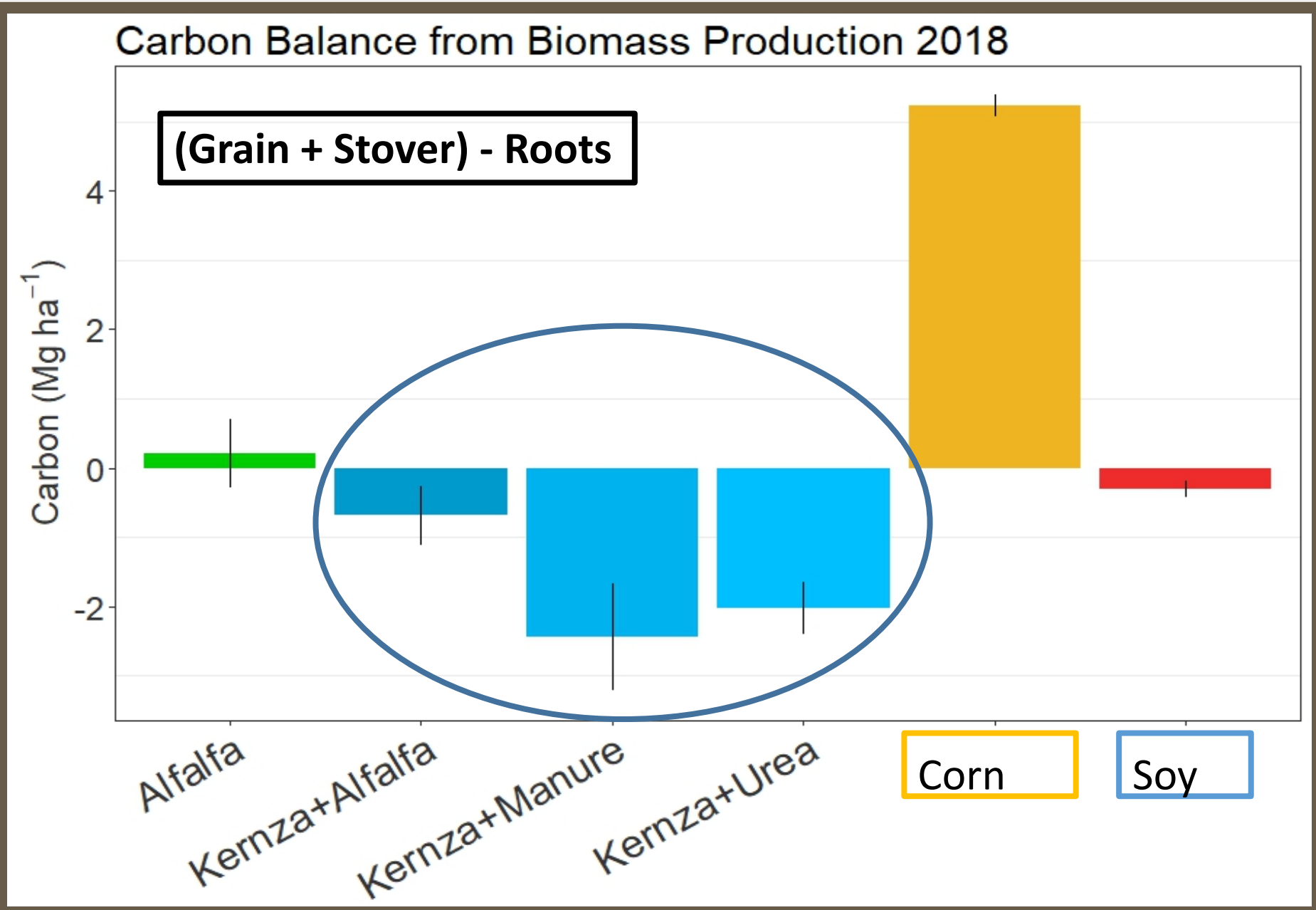
Results: Plant biomass 2018

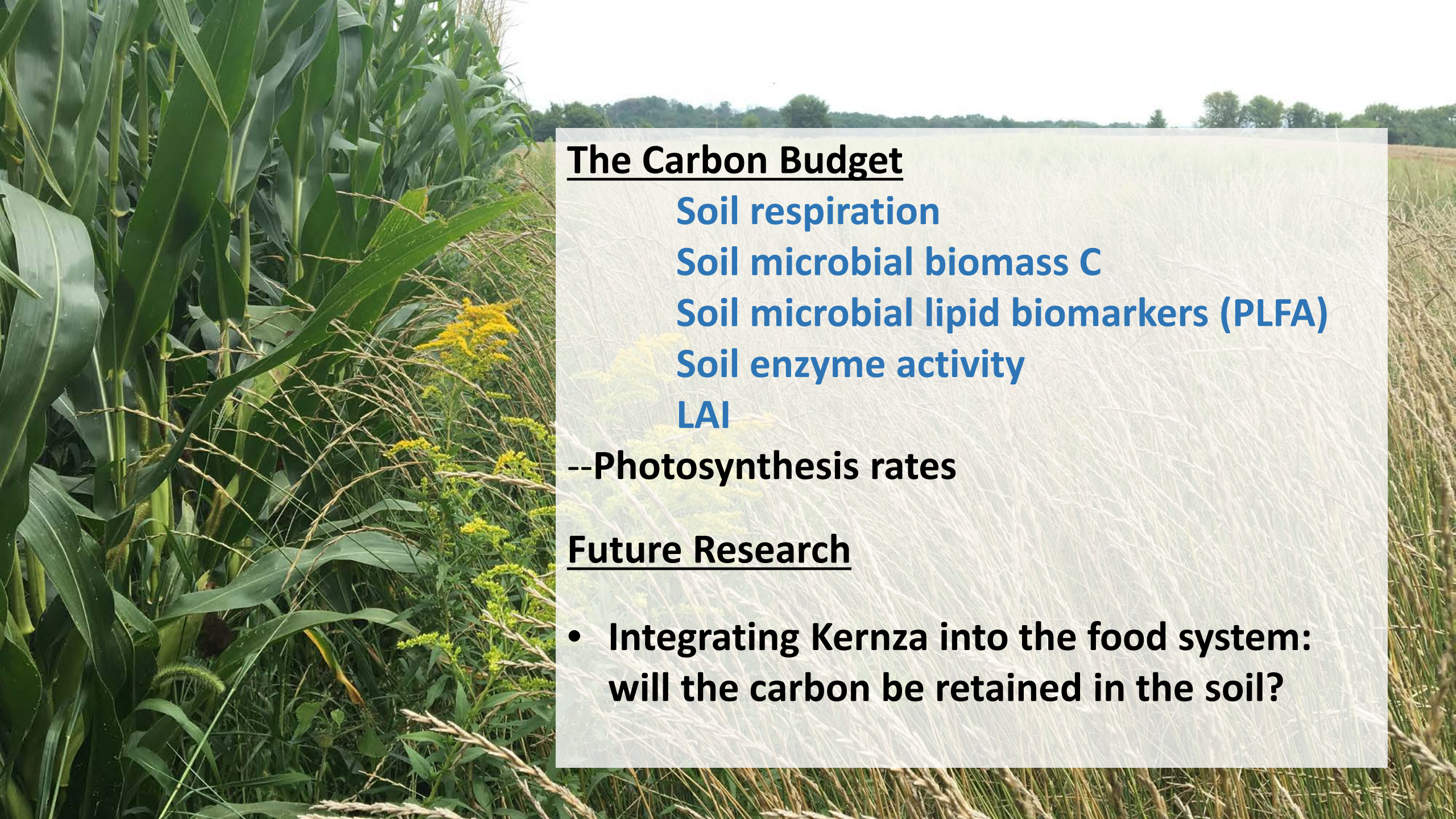


Results: Plant biomass 2018



Carbon balance from plant biomass: 2018





The Carbon Budget

- Soil respiration
- Soil microbial biomass C
- Soil microbial lipid biomarkers (PLFA)
- Soil enzyme activity
- LAI

--Photosynthesis rates

Future Research

- Integrating Kernza into the food system: will the carbon be retained in the soil?

Thank you!

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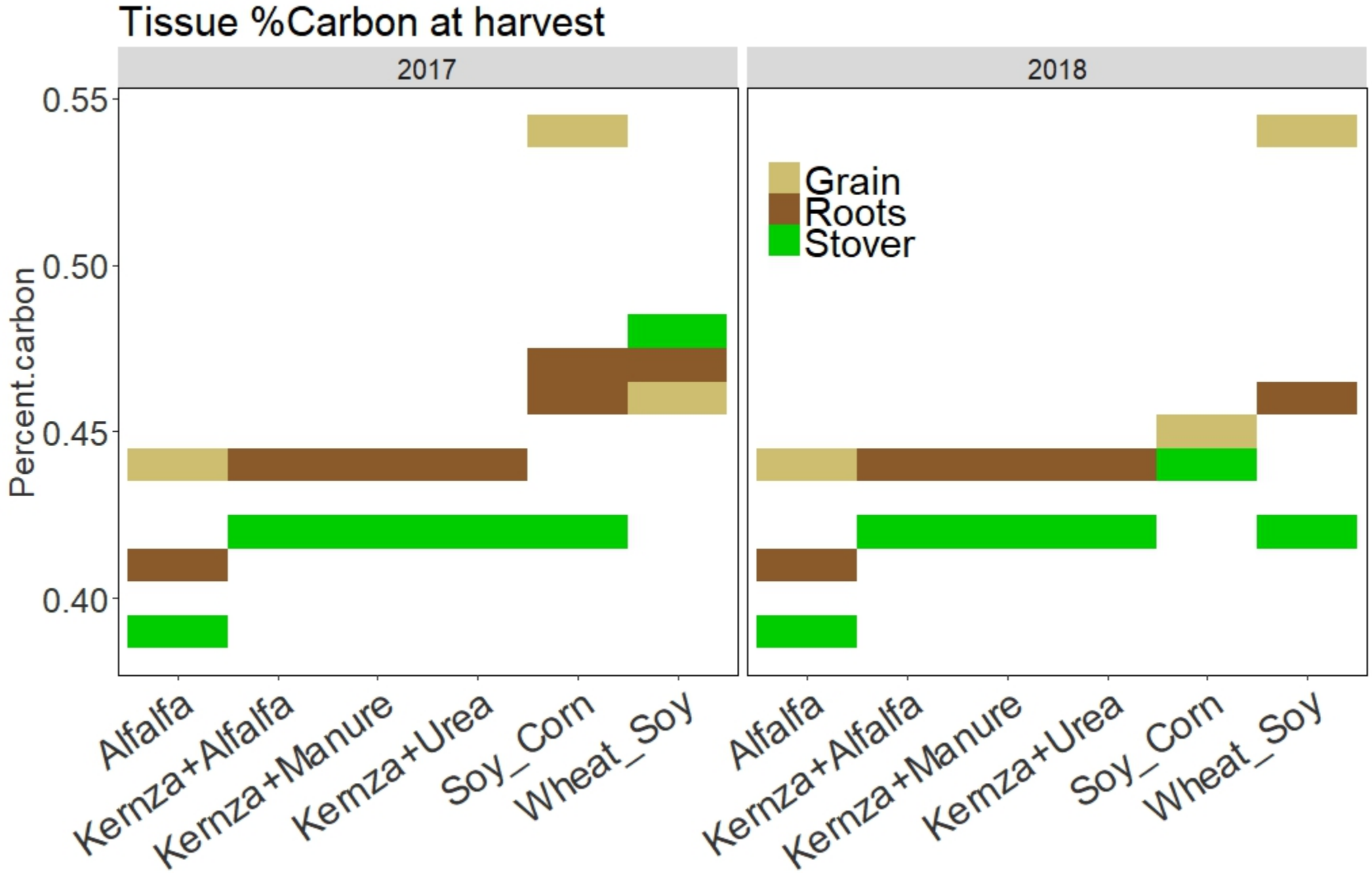
Tissue %Carbon at harvest
2017
2018
Percent.carbon
0.55
0.50
0.45
0.40
Grain
Roots
Stover
Alfalfa
Kernza+Alfalfa
Kernza+Manure
Kernza+Urea
Soy_Corn
Wheat_Soy