Soybean Carbon and Nitrogen Accumulation As Affected By Nitrogen Supply

Wednesday, November 13, 2024

2:30 PM - 4:30 PM

You must sign in to view session location

Abstract

While carbon (C) markets are booming, there is scarce information about how much C is accumulated and returned to the soil in soybean crops. Soybean residue is also considered a valuable asset because it impacts the nitrogen (N) management of the following crops. Moreover, recent research has found N limitation in high-yielding soybeans. However, the impact of N limitation on C and N accumulation and on the quality of the soybean residue is unknown. The objective of this study was to quantify C and N accumulation and residue quality (C:N ratio) of high-yielding soybean crops with and without N limitation. Replicated experiments were conducted in seven irrigated soybean fields in Nebraska (USA). These fields had consistently achieved yields >4.5 Mg ha^{-1} in previous years. A zero-N treatment was compared against a Full-N treatment that ensured ample N supply during the entire crop season through six applications of N fertilizer: V1= 87, V2= 87, V4= 174, R1= 261, R3= 261, and R5= 261 kg N ha^{-1}. Aboveground dry matter separated by plant organs was measured weekly from emergence to physiological maturity. Plant tissue samples were analyzed for N and C concentration. The N limitation reduced the C and N accumulation at physiological maturity in soybeans by 9.5% and 11.5%, respectively. The main impact was on the C and N accumulated in the residue of soybeans. Soybean crops limited by N supply had higher C:N ratio. About 50% of total C accumulated by high-yielding soybean crops remains in the residue. Nitrogen limitation can affect the quantity and quality of soybean residue.

Presenting Author

A

Henrique Antunes De Souza
Embrapa Mid North

Authors

I

Victoria Inklman
University of Nebraska-Lincoln

S
Luzviminda Ann Sazon
University of Nebraska-Lincoln

C
Speedy Donato Crisostomo
University of Nebraska-Lincoln

C
Nicolas Cafaro La Menza
University of Nebraska-Lincoln

Abstract Citation

Antunes De Souza, H., Inklman, V., Sazon, L. A., Crisostomo, S. D., & Cafaro La Menza, N. (2024) Soybean Carbon and Nitrogen Accumulation As Affected By Nitrogen Supply [Abstract]. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX. https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/158173

View Related