Soybean Root Growth Under Elevated CO2 Concentration in the Field. (C03-rodriguez111543-Poster)

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Abstract:

Factors regulating belowground plant responses to climate change are not well understood. In the Soybean Free-Air Gas Concentration Enrichment (SoyFACE) experiment in Champaign, IL, repeated in-season sampling of soybean roots (var. Pana) and soil CO2 flux were conducted in 2001 to examine the effects of elevated CO2 (550 ppm) on belowground biomass, nodulation, and carbon turnover. Roots and nodules were excavated in trenches (38 cm W, 25 cm L, 25 cm D) centered on the crop row. Soil CO2 flux was measured with a LI-COR 6400 and soil flux chamber. The greatest belowground biomass was observed 104 days after planting, and on this date, soybeans under elevated CO2 had 60% more biomass and the number of nodules and nodule weight were 95% greater than in the ambient treatment. Differences in the elevated and ambient treatments, which were insignificant at season's beginning and end, were attributed to delayed senescence in elevated treatment. Soil CO2 flux was highest 76 days after planting, and was 30% greater in elevated CO2 rings on this date. Increased carbon inputs to soils associated with the elevated CO2 treatment may be offset by enhanced soil C mineralization.

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Presentation Information:

Presentation Date: Wednesday, November 13, 2002
Presentation Time: 4:00-6:00 pm
Poster Board Number: 1014

Keywords:
soybean, roots, elevated carbon dioxide, climate change