

Abstract Submitted
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The ^{11}C Project: Measurement of Root Exudation at Elevated CO_2 Levels in Low and High Nutrient Solutions VERIDA LEANDRE, North Carolina AT SU, CALVIN HOWELL, Duke Univ. — Understanding the plant kingdom's mechanisms of resource management in variable environments is integral to predicting how plants will respond to an increase in atmospheric CO_2 . The goal of this study is to determine the effects of changing nutrient conditions on the root exudation of barley plants at elevated CO_2 levels. The ^{11}C group at the Triangle Universities Nuclear Laboratory (TUNL) tags various species of plants with short-lived positron-emitting radioisotopes in order to analyze metabolite transport in response to changes in the environment. ^{11}C is produced at TUNL using a tandem Van de Graaff particle accelerator, then transported from TUNL to the Duke Univ. Phytotron (100m) where plants are labeled with ^{11}C in a growth chamber. The chamber allows researchers to control the light intensity, air temperature, humidity and concentration of CO_2 in the air. The plant absorbs $^{11}\text{CO}_2$ in a leaf that is placed inside a cuvette through which radioactive $^{11}\text{CO}_2$ gas flows. The sugars in the labeling leaf are tagged with ^{11}C and translocated throughout the plant similar to ^{12}C . Scintillation detectors are used to track the tagged sugars as they are translocated through the plant and exudated from the root into the nutrient solution or $^{11}\text{CO}_2$ gas is respired by the root. The labeling system, detector arrangement, electronics and data analysis will be described and preliminary results will be presented.

Verida Leandre
North Carolina AT SU

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