Soil Fractionating

Overview

Doctor Kate Lajtha has been working with the Detrital Input and Removal Treatment (DIRT) plots in the H. J. Andrew's Experimental Forest for many years. This study centers around the input of soil and is designed to determine the major contributor of soil organic mater (SOM). The location of carbon storage has a great effect on global climate change (Sulzman). Understanding carbon input processes and how carbon is stored in soils can provide insight into better carbon management (*See figure 1*). It has long been hypothesized that root systems contribute more to SOM than litter fall (*See table 1 and figure 2*).

Several related projects have evolved from the DIRT plot work. Recently Doctor Lajtha has been looking at soil bound carbon and where, within soil, carbon is bound. To gain help answering this question many samples from the H.J. Andrews Experimental Forest were taken and separated by density fractionation. These samples will then be analyzed to determine their carbon content. In the future it is hoped that other soils can be analyzed in a like manner and be compared to the results of the H.J. Andrews soil.

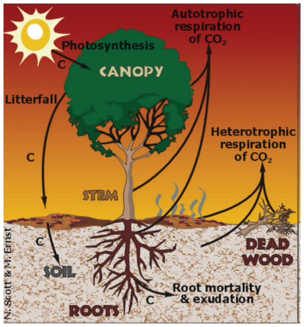

Figure 1

Treatment	Method
Control	Normal litter inputs are allowed.
No Litter	Aboveground inputs are excluded from plots.
Double Litter	Aboveground leaf/needle inputs are doubled by adding litter removed from No Litter plots.
Double Wood	Aboveground wood inputs are doubled by adding large shredded wood pieces based on measured input rates of woody debris fall.
No Roots	Roots are excluded with impenetrable barriers extending from the soil surface to the top of the C horizon.
No Inputs	Aboveground inputs are prevented as in No Litter plots, belowground inputs are prevented as in No Roots plots.

Table 1

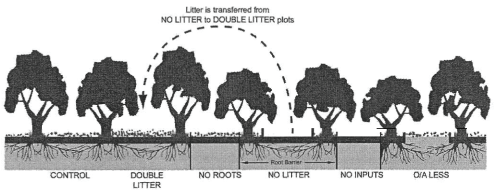

Figure 2

Methods

Samples were collected from the H.J. Andrew's Forest. These samples where then divided into two parts. One part of each sample was used to determine moisture content while the other part of the sample was density fractionated.

Moisture content:

The percent moisture was determined by weighing the sample and drying the sample in an oven at 50 decrees Celsius for at least 24 hours. The dry weight was subtracted from the wet weight and divided by the wet weight.

Fractionation:

Samples of the H.J. Andrew's soil were density fractionated using various densities of sodium polytungstate (SPT). After weighing each soil sample, a 2.8 g/cm3 solution of SPT was added along with deionized water and centrifuged. This caused the material in the soil heavier than 2.8 g/cm3 to form a pellet at the bottom of the centrifuge container and the material in the soil lighter than 2.8 g/cm3 to float to the top. This top layer was siphoned off for further separation by less dense solutions of SPT. The pellet was then rinsed with deionized water on a glass filter to remove the SPT. After the SPT was removed the soil was washed off of the filter and placed in small, pre-weighed containers to be oven dried at 50 degrees Celsius. Thoroughly dried samples where weighted and scraped into 20 mL bottles to be ground and analyzed at a future date. Material weighing less than 2.8 g/cm3 was further separated into 2.4-2.8 g/cm3, 1.6-2.4 g/cm3, and <1.8 g/cm3 pellets in the same manner.

These soil samples will eventually be ground and sent to another lab to determine their carbon content. This information could help to piece together one of the many intricate parts of the carbon cycle and to better understand how much carbon can be stored in various soils. In the future this procedure would ideally be performed on all types of soils to determine any trends in soil bound carbon.