Differences in Nitrogen and Carbon Percentages Caused by Fertilization

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Introduction

Both carbon and nitrogen are important for the health of trees. The amount or percentage of carbon and nitrogen in soil have an effect on the growth of loblolly pine *(Pinus taeda*) (native range in *Fig. 1*). Fertilization influences the percentage of nitrogen in soil due to the addition of ammonia (NH_3). The percentage of carbon in the soil has been found to not increase due to fertilization in prior studies (Johnson & Curtis, 2001) (Martikainen et al., 1989) due to the fertilizers containing primarily nitrogen. This research project is focused on determining how the percentage of carbon and nitrogen varies between thinned and released plots that have received fertilizer applications and those that have not received fertilizer application

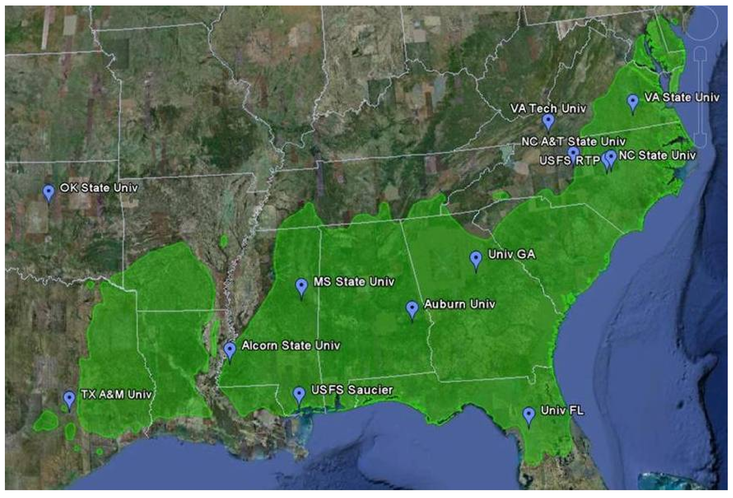

Fig. 1. The area highlighted in green represents the natural range of loblolly pine and areas studied

Methods

Soil was collected from 4 PMRC (Plantation Management Research Cooperative) sites PMRC MRTS 2nd-Thin 4, PMRC MRTS-1st Thin 13, PMRC MRTS-1st Thin 15, and PMRC MRTS-1st Thin 18. Each site was subdivided into 2 stands: fertilized and unfertilized, bringing the total to 8 plots. Soil was extracted and separated by depth into 4 categories: 0-10cm, 10-20cm, 20-50cm, and 50-100cm using a borer with a diameter of 5.2cm. Approximately 1000g of each sample was air dried and ground into fine particles using 5mm sieves, a roller mill, and a ball mill. The finely ground soil was then separated into 20mL vials which were tested for carbon and nitrogen percentages using a Flash EA 1112 NC Soil Analyzer.

Results

Analysis revealed that plots that had been released, thinned, and unfertilized, soil carbon was an average of 0.762% while nitrogen was 0.430%. In plots that had been released, thinned, and fertilized soil carbon was an average of 0.7272% and nitrogen was 0.41%. Results can be seen in *Fig. 2*.

Conclusion

The results were conclusive with past studies. Carbon percent was unrelated to fertilization but nitrogen was .07% higher in fertilized stands when compared to unfertilized stands. The higher level of nitrogen in the forest soil may also be attributed to prior management techniques.

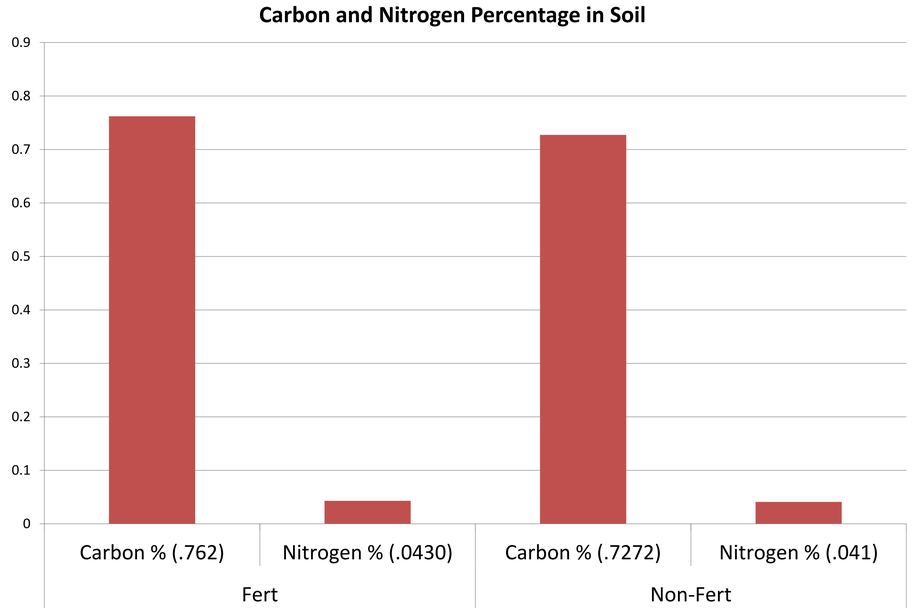

Fig. 2. Graph showing carbon and nitrogen % in fertilized and unfertilized plots

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References:

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