Estimating Soil Nitrogen Supply and Fertilizer Needs for Short-Rotation Woody Crops. (S07-scott154934-Oral)

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Abstract:

Short-rotation woody crops are sensitive to soil and site conditions, and are especially sensitive to nitrogen (N) nutrition. We measured sweetgum foliar N dynamics and soil N supply on a converted agricultural field and a pine cutover site at ages 3-6 years. Each site was treated with biannual applications of N fertilizer: 0, 56, and 112 kg N ha-1. Foliar N uptake increased with fertilization at both sites and was about 24% of fertilizer N applied. About 1.75% foliar N was needed for 90% of optimum growth. Soil N supplying capacity of 14 soils representing the spectrum of sites suitable for sweetgum plantations was characterized. We found that surface soil organic matter content was not adequately discriminating. We also tested a soil N supply model based on laboratory measurements adjusted for soil climate. The model estimates were 31 and 44 mg kg-1 at the cutover and ag field sites, respectively, whereas annual N supply was about 25 mg kg-1 on both sites. Extending our soil N supply model to other sites with a modified soil water function will enable us to predict soil N supply and fertilization needs on a site-specific basis in the Southeast.

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