Impact of Mixed and Pure Stand Eucalyptus Plantations on Soil Quality in Southwestern China

Author: Bridget S O'Banion
Co-Presenters:
Major: Environmental Science
Research Advisor: Roger Williams

Since its introduction to China in the late 1800's, the Eucalyptus tree has played a vital role in the country's development by providing a booming timber supply. The trees are grown in pure and mixed stand plantations across China, and there is interest in which plot type facilitates better growth of Eucalyptus trees. Soil quality data from pure stands (Eucalyptus urophylla x E. grandis) and mixed stands (Eucalyptus with Magnolia glauca Blume or Tsoongiodendron odorum Chun) near Liuzhou and Nanning, China, respectively, were compared to see which plantation type fostered better soil quality for Eucalyptus growth. Circular plots (n= 6 for mixed, n= 9 for pure) were established and each plot was subsequently divided into four quadrants. Two of these quadrants were randomly picked to perform soil analyses. Soil pits were dug to a depth of 40 cm and electrical conductivity, temperature, soil moisture, and pH measurements were taken at 0 cm, 20 cm, and 40 cm. Results showed that the two types of plantations varied significantly with their soil temperature and pH, but not with their conductivity or moisture, according to Duncan's multiple range test (p= 0.05). The mixed stands had a higher soil temperature and a more acidic pH than the pure stands. The higher temperature was strongly correlated to a less complete canopy cover. This lack of canopy cover, as well as lower pH, can potentially be explained by the exudates of both M. glauca and T. odorum, which may inhibit understory growth and cause soil acidification. Suggestions for future management practices to promote Eucalyptus productivity based on these results will be further discussed.