# THE IMPACTS OF SURFACE MINING RESTORATION EFFORTS ON SOIL DWELLING NEMATODE COMMUNITIES IN THE APPALACHIAN REGION[1]

Haley Smith[2]

**Abstract:** Coal is the largest component of energy required to power electrical plants. In the United States, approximately 62% of coal is mined using surface mining, a technique which destroys native ecosystems. Post-mining reclamation is required to decrease long term environmental impacts associated with surface mining. Traditional restoration of post mining sites in the southeastern U.S. utilizes methods that discourage above and below-ground succession of native flora and fauna communities. Recent advances in mining restoration techniques proposed by The Appalachian Regional Reforestation Initiative (ARRI) have improved reclamation of post-mining sites above ground by increasing native tree abundance and growth rate. The below-ground component of these reclaimed areas remains undescribed, however. The soil nematode community is an important component of a healthy soil environment. Diverse soil nematode faunas have been shown to increase nitrogen uptake in hardwood seedlings, which may play a vital role in these nitrogen-limited, early successional systems. Below-ground invertebrate communities in mining restoration sites have been largely ignored, despite their potential importance to the long-term recovery of these profoundly disturbed sites. In this study, I will address how traditional restoration methods currently approved by the Office of Surface Mining, as ARRI's Forestry Reclamation Approach (FRA), affect below-ground nematode communities. I will also examine the role nematodes play as an indicator of soil dynamics, such as soil texture, time since mining, and soil pH. Finally, I will test the role diverse nematode communities have on plant survival and nutrient uptake in mined soils, in order to assess their overall importance as bioremediators. My research will improve understanding of restoration's influence on below-ground food web dynamics, and in turn, the role nematode assemblages play in plant succession and survival.

Additional Key words: food web, nutrient cycling, nutrient feedback, bioindicators

---

[1] Paper was presented at the 2012 National Meeting of the American Society of Mining and Reclamation, Tupelo, MS ***Sustainable Reclamation*** June 8 – 15, 2012. R.I. Barnhisel (Ed.) Published by ASMR, 3134 Montavesta Rd., Lexington, KY 40502.

[2] Haley S. Smith, is a Masters Student, Entomology and Plant Pathology, University of Tennessee, Knoxville, TN 37996.