**Effects of Biomass Cropping Systems on Soil Denitrifier Community Abundance in Ontario Soils**

**Thompson, K.** (UG SES), **Deen, W.** (UG Plant Agriculture), **K.Dunfield** (UG SES)

Recently, interest in the use of plant based biomass energy has increased as a way to decrease dependence on fossil fuels. When introduced, switchgrass and miscanthus were proposed as sustainable alternatives to annual crops for biomass production. However, the effects of these perennial grasses (PGs) on soil quality indicators such as microbial abundance are largely unknown. Our objective was to assess changes in microbial and denitrifying community abundance as influenced by biomass production strategies that include PGs. Field trials were established in 2008 in a randomized complete design (n=3), comparing crop species (miscanthus, switchgrass, corn and soybean), fertilization rates (0 and 160 kg N ha-1) and biomass harvest dates (fall and spring) in Ontario, Canada. Soil was collected (0-15cm depth) from Elora and Ridgetown from 2010-2012. Quantitative PCR was used to enumerate the total bacterial communities (16S), and communities of denitrifiers by targeting nitrite reductase (nirS) and nitrous oxide reductase (nosZ) genes. Comparing conventional crops with the proposed Best Management Practice (BMP) of spring-harvested PGs, PGs were found to have higher nirS, nosZ, and 16S abundances than the annual rotation over time at Elora only. These results indicate BMP PG plots may support larger denitrifying communities than annual rotations or fall-harvested PG plots, which signifies that BMP PG plots may have a lesser negative effect on microbial functioning and associated soil nitrogen-cycling processes than annual biomass crops. Our results suggest biomass production management influences soil microbial communities, this influence is dependent on field site, and abundances respond to seasonal differences.