Abstract for Oral Presentation given at Fall 2010 Meeting of the South Carolina Branch of the American Society for Microbiology

G. Lewis and M.-K. Liao. 2010. Urban influences on bacteria in streams of the upper piedmont, South Carolina.

Background. Streams draining urban areas typically receive increased nutrient and pollutant loads and support less diverse communities of macroinvertebrates and fish compared to rural streams. Also, concentrations of fecal-indicator bacteria in urban streams may exceed public health standards. However, few studies have examined the impact of urbanization on bacterial community composition in streams. We have investigated the differences in the bacterial communities in urban and rural streams in the upper piedmont of South Carolina. First, during 2008-2010, we repeatedly sampled three streams representing a range of land covers: Brushy Creek, a stream draining a heavily urbanized watershed, the South Pacolet River, a stream draining a watershed dominated by forest and pasture, and the Middle Saluda River, a stream draining a forested watershed. During summer 2009 and winter 2010, we sampled multiple streams in watersheds with predominantly commercial, residential, or forest land cover. Most recently, beginning in summer 2010, we have focused on the influence of effluent release from a chicken processing plant on the microbiology of an urban headwater stream in the Brushy Creek watershed. **Methods**. We measured concentrations of major ions and dissolved organic carbon from all water samples. Concentrations of fecal indicator bacteria (total coliforms, *Escherichia coli*, and *Enterococcus*) were determined using IDEXX™ test kits. Concentrations of bacteria resistant to ampicillin, chloramphenicol, kanamycin, or tetracycline also were quantified. The diversity of 431 bacterial isolates from multiple urban and forest streams was analyzed by RFLP or 16S rDNA sequences. The *E. coli* populations up- and downstream of the chicken processing plant are being analyzed by ECOR typing the isolates. **Results**. Urban streams had higher concentrations of nitrate, chloride, sulfate, and bicarbonate than did forest streams. The highest concentrations of fecal indicator bacteria tended to occur in urban streams, but comparisons of urban and forest streams were not statistically significant on all dates. Concentrations of antibiotic-resistant bacteria tended to be highest in streams draining commercial land cover and lowest in forest streams. Ampicillin-resistance was more common than resistance to other antibiotics in streams draining all land covers. Finally, preliminary results suggest different genetic diversity of *E. coli* populations up- and downstream of the chicken processing plant. **Conclusion**. Our data indicate distinct signatures of urban land cover (both commercial and residential) in the chemical and microbial composition of stream water. In addition to influences of land cover, point-sources within urban areas may influence the microbial diversity within urban streams.