EFFECT OF VEGETATION ON BACTERIAL TRANSPORT AND REMOVAL IN AGRICULTURAL SOILS
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Introduction
In the U.S., waterborne pathogens cause 19.5 million illnesses per year, and are the number one cause of water quality impairment (Bridge, 2010; EPA, 2013). The Southeast has 4,227 waterbodies that fail to meet bacterial water quality standards. Agriculture is the primary source of pathogen loading in surface waters, originating directly from livestock operations or through the land application of manure. There is a critical need to develop and evaluate best management practices (BMPs) to mitigate bacterial transport from agricultural operations to the environment.

Vegetative filter strips (VFSs) are a BMP that has been shown to effectively attenuate the transport of nutrients and sediments from agricultural operations. Limited research has focused on evaluating the efficacy of VFSs in bacterial removal.

Approach
The goal of this research is to understand the mechanisms affecting the fate and transport of pathogenic bacteria in vegetated soil systems in order to improve agricultural BMPs to limit pathogen movement in the environment.

Vegetated soil boxes will be used to investigate bacterial fate and transport. E. coli MG1655 modified with green fluorescent protein (GFP) will serve as a model organism, which can be distinguished between colloid and the indigenous bacteria. Samples collected from subsurface flow and runoff will be examined using plating techniques.

Questions to Answer
1. How do the following effect the transport of bacteria in a VFS system:
   * vegetation type
   * soil type
   * slope
2. How effective is a VFS system in attenuating bacteria?
3. What is the major mechanism involved in mitigating bacterial movement?

References