Applying knowledge to improve water quality
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The Role of Ponds in Reducing the Threat of Pathogen Contamination from Livestock in Agricultural Watersheds

Gastrointestinal illness from exposure to recreational and municipal drinking waters has focused public attention on animal agriculture as a potential source of pathogenic microorganisms contaminating surface and shallow subsurface water. Recent observations have indicated that ponds in watersheds with stream inflows and outflows reduce the concentration of fecal bacteria, but a systematic study is needed to substantiate this observation and establish the prophylactic usefulness of ponds in watersheds. Our project is investigating two watersheds with ponds in which animal agriculture occurs, one in the Southern Piedmont in Watkinsville, GA, and one in the Southern Coastal Plain near Tifton, GA. The watersheds are impacted by beef cattle and dairy cattle respectively. We will determine the spatial and temporal distribution of load delivery of fecal indicator bacteria and pathogens (Salmonella and Escherichia coli 0157:H7), study the correlation between fecal indicator bacteria and pathogens, establish the load reduction efficiency of ponds during base and storm flow; and we will elucidate the processes in ponds that affect the survival of fecal indicator bacteria. We will examine exposure to solar radiation (UV), residence time, settling out and flocculation, and interactions with aquatic microflora as possible mechanisms eliminating fecal bacteria. The results of both the field and laboratory experiments will improve our understanding of the sources and fluxes of fecal bacteria in watersheds impacted by animal agriculture, and establish a basis for developing more effective management practices that better protect our nation’s water resources.

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