



THESIS DEFENSE

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Drainage Water Recycling Impacts on Amphibian Populations in a Wetland Ecosystem

Abstract: Drainage water recycling (DWR) is used in agricultural landscapes to manage water resources, but its effects on wetland ecosystems and amphibian populations are not well understood. This study focuses on a depressional wetland located at Purdue University's Agronomy Center for Research and Education (ACRE) in central Indiana, where subsurface tile drainage from surrounding crop fields enters the system. Amphibian activity, water quality, and wetland hydrology were monitored throughout the 2025 field season to evaluate how DWR influences habitat conditions. Amphibian surveys conducted from April through September documented species presence, calling activity, and capture observations. Cope's Gray Treefrog was the most frequently observed species, while Spring Peepers and Green Frogs showed more seasonal patterns. Following the installation of DWR, water levels remained elevated for longer periods, extending surface water presence by approximately 8 to 12 weeks compared to pre-control conditions. This increase in hydroperiod improved the availability of aquatic habitat during key breeding and larval development periods. Water quality monitoring identified several commonly used agricultural herbicides, including atrazine, metribuzin, metolachlor, and 2,4-D. Concentrations were highest early in the sampling period and declined over time, reflecting seasonal application and runoff patterns. Although some differences between sampling locations were observed, they were not statistically significant. Results indicate that DWR can enhance wetland hydrology in ways that support amphibian habitat while also introducing agrochemical exposure. These findings highlight the importance of considering both ecological benefits and potential risks when evaluating water management practices in agricultural systems.



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Bio

Ronnie Bernard is an M.S. candidate in Agronomy, affiliated with the Interdisciplinary Ecological Sciences and Engineering Program. He received a B.S. in Agricultural Science from Alcorn State University. His research focuses on wetland hydrology, water quality, and amphibian habitat dynamics in agricultural landscapes. He investigates how drainage water recycling alters wetland hydrology, which, in turn, affects amphibian distribution, diversity, and habitat sustainability in agricultural ecosystems.