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Amphibian use of stream habitats in an agricultural landscape

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Although many causes for worldwide amphibian population declines are under investigation, the destruction and alteration of aquatic habitats remains a primary threat. In agricultural landscapes, natural wetlands are often filled or drained and farm ponds are generally stocked with fish. Because suitable breeding habitats may be limited, streams and habitat along streams may provide important refuges for amphibians. Previous studies have shown that amphibians call from streams, but it is unclear whether agricultural streams 1) provide suitable habitat for amphibian reproduction and larval development, or 2) act as ecological traps. To address this question, we surveyed twenty-six streams located in north-central Missouri for evidence of amphibian reproductive success. Each survey included a time-constrained dip-net effort for larvae and metamorphs, as well as measurements of basic water quality parameters such as pH and conductivity. We also performed a physical habitat assessment using a modified EPA protocol for wadeable streams, emphasizing characteristics that would be necessary for amphibian reproduction success (e.g., areas of in-channel cover and refuges from high-flow conditions). Evidence of reproduction was detected for four anuran species. Bullfrogs (Rana catesbeiana) were by far the most common species detected, occurring at twenty-four of twenty-six sites. These preliminary results indicate that agricultural streams can serve as breeding and larval habitats for amphibians, although the prevalence of bullfrogs suggests that these habitats may favor larger-bodied species with strong competitive ability. Additional analyses will determine whether the presence or absence of individual species can be predicted by local (e.g., stream buffer width) or watershed-level (e.g., percentage of row crop land use) variables. Ultimately, this work should provide information to improve amphibian conservation efforts in agricultural areas.