ABIOTIC AND BIOTIC CONTROLS ON AQUATIC INSECT EMERGENCE FROM PRAIRIE STREAM REFUGIA DURING DROUGHT CONDITIONS IN A TALLGRASS PRAIRIE STREAM

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Nutrients and energy transported from a donor ecosystem into a recipient ecosystem where they stimulate primary or secondary production are known as resource subsidies. One well-known example of a resource subsidy is the emergence of aquatic insects. The flux of aquatic insects into terrestrial environments provides an important food source for riparian predators such as reptiles, spiders, birds, and bats. Fishes are known to control aquatic insect emergence through predation, but less is known about how fishes interact with abiotic stressors, such as extreme drought, to affect emergence. We examined how severe drought, which resulted in longitudinal disconnection of flow, high water temperatures, and high predator densities, affected the flux of adult aquatic insects from 12 drying pools over a four week period in a tallgrass prairie stream at the Konza Prairie Biological Station in the Flint Hills, KS. Preliminary results indicate three general patterns: (1) Average emergence abundance and biomass across 12 pools declined from 60 individuals/m^2/day and 54.8 mg/m^2/day, respectively, on the first sampling date to 37 individuals/m^2/day and 30.6 mg/m^2/day on the final sampling date; (2) on the first sampling date, there was a trend of lower emergence abundance and biomass with increasing pool surface area (R^2=0.29, p=0.07 for both abundance and biomass); and (3) emergence abundance and biomass were not correlated with fish abundance (R^2=0.01 and 0.02, p=0.72 and 0.69, respectively). Together these results indicate that abiotic factors may exert a stronger control on insect emergence than biotic factors. Results from this study demonstrate that lower pool surface area may confer high emergence rates during harsh, drying conditions such that insects emerge to avoid desiccation, but total emergence biomass is likely higher over time from pools with greater surface area due to their abilities to support more invertebrates.

PRESENTER BIO: Adam is a PhD student in the Soil and Water Sciences Department. His work focuses on the effects of manatees on coastal spring ecosystems. He is also conducting research on aquatic emergent insect subsidies in a tallgrass prairie stream at the Konza Prairie Biological Station in Kansas.