"Prairie Potholes and Pesticides: Assessing the effects of neonicotinoids on wetland chironomid community structure and emergence in the Prairie Pothole Region"

The use of neonicotinoid pesticides is pervasive in agricultural regions, including the Prairie Pothole Region of North America. There is increasing concern that these pesticides are having harmful effects on non-pest organisms, with particular concern for bees and other pollinators. There use can also potentially have large impacts on freshwater ecosystems, and aquatic insects have been shown to be particularly vulnerable. Neonicotinoids are highly water soluble, and can be transported readily to nearby surface waters. In this talk, I will present some of my lab’s research focused on understanding the impacts of neonicotinoids on prairie pothole wetlands. Neonicotinoids have frequently been detected in streams and wetlands in areas dominated by agriculture. In 2017, we conducted a survey of wetlands in Waterfowl Protection Areas in Western Minnesota, which spanned a gradient of agricultural use in their catchments. Not surprisingly, sites with greater grassland buffers had reduced detections, but neonicotnoids were still found in protected sites. To assess the potential impact to wetland habitats, we conducted a mesocosm experiment and examined the impacts on neonicotinoid additions to chironomid communities. Our results suggest that repeated short-term contamination of wetland ecosystems by neonicotinoids at low concentration levels could have significant impacts on prairie pothole wetland invertebrate communities, which could have cascading impacts through wetland ecosystems.