A longitudinal study utilizing citizen science to assess the presence of atrazine within the Mississippi River watershed.

Monica Blaser, Krystal Herrmann, Dr. Alan Kolok
Nebraska Watershed Network, Department of Biology, University of Nebraska at Omaha, Omaha, NE 68182

Introduction

Atrazine, a commonly used herbicide on corn and soy bean crops in the Midwest, can easily migrate to surface waters from agricultural fields. This occurs mostly due to the timing of application of the herbicide. Atrazine is typically applied during the early to mid portions of the growing season which coincides with late spring when rainstorms are a general occurrence (Ali and Kolok 2015; Kolok et al. 2014; Lerch et al. 2011). The greatest concerns associated with atrazine run-off are the potential threats to human health and the environment. Previous studies suggest that atrazine is an endocrine disruptor meaning it has the ability to interfere with the natural hormonal system (Hayes et al., 2011). Scientists have recorded adverse affects on the reproductive systems of aquatic wildlife in the presence of the natural hormonal system (Hayes et al., 2011). Scientists have also reported potential threats to human health and the environment. Previous studies suggest due to the timing of application of the herbicide. Atrazine is typically applied during the mid-season growing season.

Atrazine, a commonly used herbicide on corn and soy bean crops in the Midwest, can easily migrate to surface waters from agricultural fields. This occurs mostly due to the timing of application of the herbicide. Atrazine is typically applied during the early to mid portions of the growing season which coincides with late spring when rainstorms are a general occurrence (Ali and Kolok 2015; Kolok et al. 2014; Lerch et al. 2011). The greatest concerns associated with atrazine run-off are the potential threats to human health and the environment. Previous studies suggest that atrazine is an endocrine disruptor meaning it has the ability to interfere with the natural hormonal system (Hayes et al., 2011). Scientists have recorded adverse affects on the reproductive systems of aquatic wildlife in the presence of the natural hormonal system (Hayes et al., 2011). Scientists have also reported potential threats to human health and the environment. Previous studies suggest due to the timing of application of the herbicide. Atrazine is typically applied during the mid-season growing season.

Conclusion and Future Directions

This project provides evidence that atrazine presence within the Mississippi River watershed fluctuates over time throughout the planting and/or growing seasons. This could imply that atrazine is introduced in spike events instead of constant flow. It is highly plausible that precipitation events within the growing season at key application times is the main driver behind the changes in the presence of atrazine and accounts for the lack of continual hotspots. Future research should include the collection of additional data points pertaining to rainfall dates and quantity, and if possible, estimated atrazine application amounts.

References


Figure 1a. Results from Lil’ Miss Atrazine 2014. Negative responses are in blue, positive in red.
Figure 1b. Percentage breakdown of the results of LMA 2014.

Figure 2a. Map of testing sites from LMA 2016. The colors represent the different watersheds that were part of the study.
Figure 2b. Visual breakdown of the results of LMA 2016. Negative responses are in blue, positive in green.