

SAVE THE FROGS

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WHY FROGS?

The species *Xenopus laevis* is native to sub saharan Africa, but ever since its discovery in effectiveness in pregnancy tests, the frog now lives invasively around the world. Today the *Xenopus laevis* is used mostly in laboratories as a model organism for studying developmental biology (Willigan 2001). The commercialized herbicide Atrazine, has been found to interact with this model organism species in an odd way you might not have guessed (Sanders 2010). Atrazine is primarily absorbed in the gastrointestinal tract and has been shown to have neuroendocrine, reproductive, and developmental effects on experimental animals such as *Xenopus laevis* (ATSDR 2004). The toxic nature of Atrazine has been found to emasculate male frogs in a study by biologists at the university of California, Berkeley (Sanders 2010). Frogs are extremely susceptible to environmental disturbances due to their permeable skin. This makes them accurate indicators of stressors in the environment (Kerry 2017). This is why we find it imperative to study the effects of Atrazine on frogs, not only because knocking out a species can affect food chains in areas where they reside but it also affects those halfway across the globe, hundreds of miles from its immediate reach.

**How does Atrazine
effect us
environmentally,
economically, and
socially?**

ENVIRONMENTAL

Being an invasive species, *Xenopus laevis* has found its way into many ecological systems around the world where it had previously not existed. *X. laevis* frogs prey on small fish, tadpoles, annelids and other small aquatic or semi aquatic organisms. With that being said, the frog is prey to many animals such as otters, reed cormorants, darters, largemouth bass, and many species of herons (Willigan 2001). Disrupting the *Xenopus* population through the prolonged use of Atrazine would in turn affect these predator populations, forcing them to find other sources of food.

SOCIAL

Adult *Xenopus* eat large quantities of insects everyday. They have a natural position in the food chain in regards to the insect population. Farm fields that contain atrazine from farming practices often have atrazine leave the farm field via freshwater run off. This occurs after a heavy rain and the water can run into lakes, ponds, or streams. The atrazine reduces the *Xenopus* population, therefore causing an increase in the number of insects in the food chain. Insects are known disease vectors to humans. Since there are more insects there is more of a chance that a human may come into contact with those insects. Some examples of vector borne diseases include malaria, lyme disease, and zika virus (Kriger 2017). This proposes the idea that atrazine use has an indirect effect on human health. This is how atrazine influences society. The decrease in the *Xenopus* population also causes the largemouth bass population to decrease, since *Xenopus* is one of their food sources. This would affect the amount of fish in lakes, ponds, and streams. Due to this, there is less fish to catch and societies popular pastime and sport of fishing would be affected. If atrazine was stopped from being used it would benefit human health and fishing practices.

ECONOMIC

Xenopus frogs interact with humans in more ways than you think. *Xenopus* frogs are considered a model organism, which allows us to use them as organisms in laboratory experiments. Genetically, these frogs are very similar to humans. We have studied them to help us better understand human diseases and vertebrate embryology (Cambridge, 2022). Having these frogs as a resource, it proves research in understanding human diseases. Introducing Atrazine into an environment where *Xenopus* frogs live would be detrimental and would kill off a model organism that we use in research. On the other side of this argument, many have said that *Xenopus* frogs have been invading fish populations and causing fish decline. However, there are no reported cases where clawed frogs were the direct cause of fish decline (Crayon 2005).

ALL TOGETHER

The use of atrazine is a highly controversial topic. There have been many studies that show atrazine has a direct effect on the *Xenopus* population and their development. *Xenopus* are vital to our fragile ecosystem and when they are disrupted it affects not only the rest of the ecosystem, but it affects our sustainability. This includes affecting us economically and socially as well. We hope that by providing you with this knowledge on atrazine that you will help take a stand against the use of it and advocate for more research on its threat to a sustainable world.

Citations:

Appendix A: Background Information for Atrazine and Deethylatrazine. (n.d.). Agency for Toxic Substances and Disease Registry. Retrieved April 27, 2022, from <https://www.atsdr.cdc.gov/interactionprofiles/ip-10/ip10-a.pdf>

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