

Rami Alouzi

STUDENT, BACHELOR OF SCIENCE - BIOLOGY MAJOR

Devin Hughes, Emily Pollock

RESEARCH TEAM MEMBERS

Herbicide glyphosate effects on Brown Planaria (*Dugesia dorotocephala*) and potential mortality rates using aquatic toxicity tests

Herbicide glyphosate is a widely used pesticide as a weed killer in many agricultural practices in Alberta and worldwide. As production rate and demand increases, so does the need for quality assurance and increase use of glyphosate. So about 750,000 tonnes of glyphosate are used annually and expected to rise up to 920,000 tonnes by 2025 at \$10 billion US in the global market. The highest concern is that this increased use of the glyphosate results in a lot of herbicide residues in the soil which can be transported by runoff water to nearby lakes and rivers. The hypothesis that 0.1 to 35 mg/L of glyphosate would cause planarian death due to the variability of data in recent years of different studies. The objective of this study was to investigate the concentrations that caused 50% death (LC50) of a common bioindicator of aquatic toxicity, brown planarian flatworm (*Dugesia dorotocephala*). This flatworm is used because it is an incredibly abundant species that lives in freshwater and nearby lakes in

Alberta. The experiment was split into 3 trial phases of aquatic toxicity tests in freshwater. Starting with the first trial, concentrations of glyphosate of 0.053, 0.106, 0.159, 0.212 mg of glyphosate/L were used. From this trial there were no signs of death to the worms but some signs of stress that led to some cut off tails due to different factors. Second trial consumed 306,510,816 and 1020 mg of glyphosate/L where observations indicated no signs of death or stress. In the third trial, glyphosate concentrations of 1071,1250,1500 and 1666 mg of glyphosate/L were used. The results indicated death rates of 45% of flatworms in 1250mg/L and 30% of flatworms in 1071mg/L. So, the results show inconsistency of the acquired data from the study vs other studies as the death rate was at around 1071 to 1250mg/L of glyphosate.

Research Advisors: Dr. Xin Chen, Professor, and Dr. Emmanuel Mapfumo, Associate Professor