

TREATING NON-POINT SOURCE COCKTAILS: PESTICIDE REMOVAL UTILIZING IN-STREAM BEST MANAGEMENT PRACTICES

DWFI-Supported Student Research

Each year DWFI leverages Robert B. Daugherty Foundation funds and additional donor funds to support graduate and undergraduate student research and creative activity. Funds are matched one-to-one by their DWFI Faculty Fellow advisors. This year we had to cancel our annual research forum, scheduled for April 2, and missed seeing the students present their work in person.

To celebrate the incredible research being done, students have shared a brief summary of their work and its impact. We're excited to share their work with you here. View more research from DWFI's supported students » <http://dwfi.us/Gx3150ze6F5>



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WHAT?

Neonicotinoids class of insecticides are emerging contaminants that were introduced in the global market in the early 1990s. Since then, the use of neonicotinoids class of insecticides continues to increase globally. Today, over 120 countries around the world have registered the use of these insecticides. This chemical substance is used by farmers to help control crops insect, pests, and fungi and increase crop yield, but some studies have shown otherwise. For example, studies have shown that neonicotinoids are harmful to non-target insects such as honeybees, etc. Also, it has been investigated that once these insecticides are applied in the environmental, they can undergo various forms of environmental interaction that could result to the formation of possible byproducts that are harmful to human, terrestrial species, and aquatic organisms. In this respect, our studies are focusing on investigating the fate and transport of neonicotinoids in rivers adjacent to agricultural intensive regions especially in Midwestern and Southeastern rivers like Elkhorn river in Nebraska and Neuse river in North Carolina are limited.

SO WHAT?

At this point of our research, we have been able to successfully complete one year of synoptic field sampling and data collection on water quality at our two distinct studies sites (Nebraska Site – Elkhorn River and North Carolina site – Neuse River). Polar Organic Chemical Interactive Sampler (POCIS) and grab samples were simultaneously collected and analyzed. The focus was to measure the concentration of neonicotinoids class of insecticides. So far, preliminary results indicate neonicotinoid concentrations present, but dependent on precipitation and application periods during the growing season.

NOW WHAT?

We are expected to collect more field and laboratory experimental data. This study has direct implications on how insecticides are monitored and degrading in agricultural impacted ecosystems. Further, preliminary data indicates several neonicotinoid concentrations exceeded acute and chronic ecological limits. Results are being used to determine pesticide degradation “hot spots” and “hot times”, which will lead to guidance for growers on how and when to apply pesticides to have minimal impact on non-target species (aquatic organisms, honeybees, and human).