

Living on the edge: agrochemical pollutant contamination in tropical forest insects

Supervisory team:

Main supervisor: Dr Filipe Machado França (University of Bristol)

Second supervisor: Dr Christoph Grüter (University of Bristol)

Non-academic (CASE) supervisor: Dr David Megson (Chemistry Matters)

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Collaborators: Prof Elder Morato (Federal University of Acre), Prof Sabina Ribeiro (Federal University of Acre)

Host institution: University of Bristol

CASE partner: Chemistry Matters

Project description:

Insects constitute most of all known species and play crucial roles in crop yields, food production and economies. Tropical forests are global hotspots of insect diversity and provide many ecosystem services upon which humanity relies. The Amazon, in particular, is the largest remaining tropical rainforest with an exceptional socio-ecological importance. However, our ability to inform effective sustainable agriculture practices and environmental policies in the tropics is limited by two critical factors: [1] the scarcity of comprehensive assessments of insect biodiversity trends across the tropical forest and agricultural systems; and [2] limited knowledge of how landscape context, agricultural expansion, and agrochemical use drive pollutant contamination in tropical forest ecosystems.

Your PhD journey will lead you to the tropical forests of the Brazilian Amazon, where you will investigate agrochemical contamination in soils and insects to address key knowledge gaps that limit our ability to enhance sustainable agriculture in one of Earth's most biodiverse regions. You will study dung beetles and Meliponini stingless bees in farm-forest frontiers across three Amazonian regions. Your research will [1] identify prevalent and high-risk pollutants for tropical forest soil and insects; [2] assess if pollution effects vary with landscape context, species and functional groups; [3] reveal the source, scale, and influence of pollutant contaminants in tropical forests; and [4] inform sustainable agriculture practices through insights gained from insect responses to diverse agricultural intensification scenarios.

Your research will combine cutting-edge ecotoxicology techniques, satellite- and field-based environmental indicators, insect community and trait data, and scenario analysis – which will equip you with a diverse skillset applicable to both research and industry. Your mentorship will be under a multidisciplinary team of experts on tropical ecology, insect behaviour and ecology, agrochemical pollution, analytical chemistry, and environmental sciences. Across the project, you will meet periodically with your supervisory team and be immersed in a vibrant community of researchers and postgrad students.

Our aim as the SWBio DTP is to support students from a range of backgrounds and circumstances. Where needed, we will work with you to take into consideration reasonable project adaptations (for example to support caring responsibilities, disabilities, other significant personal circumstances) as well as flexible working and part-time study requests, to enable greater access to a PhD. All our supervisors support us with this aim, so please feel comfortable in discussing further with the listed PhD project supervisor to see what is feasible.