

# Uncovering the impacts of chemical pollution on wildlife behaviour: new approaches and future directions

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Animal behaviour is highly sensitive to disruption by chemical pollution, with potentially far-reaching consequences for ecological and evolutionary processes in contaminated wildlife populations.

However, many of the approaches conventionally used to study pollutant effects on animal behaviour do not fully capture the complexity of the natural environments in which contamination occurs. Much of the existing research in this area has focused on single species, single chemicals, and individual behaviours measured in confined arenas. Although these studies have been essential, they provide only a partial picture of how pollution affects animal behaviour in the real world.

In this lecture, I will discuss how behavioural ecotoxicology is developing from simplified laboratory tests towards approaches that can reveal how contaminants affect animals under more realistic conditions. I will highlight three main areas in which the field is advancing: increasing environmental realism, better accounting for ecological complexity, and applying new methods that allow behaviour to be studied with greater accuracy and detail. This includes topics that have so far received limited research attention, such as social behaviour and collective dynamics in contaminated animals, interactions among multiple stressors, and differences among individuals in their responses to contaminants.

I will explore these themes through selected examples from my research programme, including field-based work on Atlantic salmon (*Salmo salar*) in the River Dalälven, where my team investigated how exposure to pharmaceutical pollutants influenced river-to-sea migration behaviour. This work illustrates how contaminants can alter behaviour under natural conditions, and underscores the value of combining field studies with mechanistic and experimental approaches to better understand when behavioural disruption is likely to have broader ecological consequences.

Overall, the lecture will emphasise behaviour as a key pathway through which contaminants can influence ecological systems, and will highlight the need for a stronger ecological perspective within ecotoxicology. I will also outline future directions for my research, including the integration of environmentally realistic exposures, multiple-stressor approaches, and high-resolution field methods to improve our ability to predict when contaminant-induced behavioural changes are likely to scale up to affect wildlife populations.