# New research reveals impact of human medication on Atlantic salmon migration



Every spring, juvenile Atlantic salmon embark on a challenging migration from their freshwater habitats to the sea, navigating hazards such as predators and dams. New research published in the journal Science has found that exposure to trace amounts of human medication, specifically the anti-anxiety drug clobazam, may significantly influence the success of this journey.

A collaborative study led by researchers from the Swedish University of Agricultural Sciences focused on the River Dal in Sweden, where the team meticulously monitored 730 smolts, or juvenile salmon, as they migrated. Over two spring seasons, the study sought to assess the impact of two prevalent pharmaceuticals found in aquatic ecosystems: clobazam, a benzodiazepine, and tramadol, an opioid painkiller. The investigation provided some insights into how these drugs, often present at biologically active levels, interact with the natural behaviours of salmon.

As highlighted by co-author Dr. Marcus Michelangeli, an ecology lecturer at Griffith University, “Pharmaceutical pollutants are an emerging global issue.” He pointed out that psychoactive substances, particularly those used to treat anxiety and mood disorders, could disrupt key neurological processes in wildlife. The accumulation of these drugs in waterways occurs through various channels, including human waste and inadequate wastewater treatment.

In this extensive field study, researchers surgically implanted slow-release devices into the salmon, administering the two drugs in a way that mimicked natural exposure. The salmon were divided into four groups, including those receiving clobazam, tramadol, a combination of both, and a control group with no drugs. Their movements were tracked over a distance of 28 kilometres, which included navigating two hydropower dams.

Findings from the research revealed that smolts exposed to clobazam were more successful at reaching the Baltic Sea than their counterparts in other groups. These fish demonstrated a much quicker passage through the hydropower dams, completing the journey in approximately eight hours compared to up to 64 hours for those receiving the mixture of drugs. This suggests that clobazam potentially improved their navigation through physical barriers, even though overall migration speeds did not significantly increase.

Conversely, tramadol did not appear to have nearly the same effect, with results similar to the control group, while the combination of clobazam and tramadol fared worse than clobazam alone.

To delve deeper into the behavioural changes caused by clobazam, follow-up laboratory experiments assessed whether the drug influenced shoaling behaviours among the fish. When faced with a predator, clobazam-exposed salmon exhibited weaker shoaling tendencies, which may lead to further dangers in the wild by increasing their exposure to threats.

The broad implications of this research extend beyond just the salmon themselves. While increased migration success for clobazam-exposed fish may seem advantageous, the potential behavioural shifts could have detrimental consequences. Dr. Michelangeli cautioned that while “the increased migration success in salmon exposed to clobazam might seem like a beneficial effect, any change to the natural behaviour and ecology of a species is expected to have broader negative consequences both for that species and the surrounding wildlife community.”

The study underscores the urgent need for further research to comprehensively understand the long-term effects of pharmaceutical pollutants not only on salmon populations but also on the overall health and stability of aquatic ecosystems.

Addressing this pressing environmental concern could involve enhancing wastewater treatment facilities to filter out these contaminants more effectively and innovating drug design to produce compounds that degrade more rapidly or present reduced ecological risks.

Such findings raise awareness about the complexities of how human activities impact wildlife and ecosystems, signalling a pressing need for ongoing investigation and multi-faceted strategies to mitigate pharmaceutical pollution in natural habitats.

Source: [Noah Wire Services](https://www.noahwire.com)

## References

* <https://www.eurasiareview.com/11042025-drug-pollution-alters-migration-behavior-in-salmon/> - This article corroborates the findings that clobazam exposure improves migration success and speeds up passage through hydropower dams for juvenile salmon. It also highlights the broader implications of pharmaceutical pollutants on wildlife.
* <https://cosmosmagazine.com/news/atlantic-salmon-benzo-pollution/> - This piece supports the claim that clobazam enhances the migration success of salmon, increasing the number reaching the end of their river-to-sea migration and their speed through turbines at hydropower dams.
* <https://news.griffith.edu.au/2025/04/11/drug-pollution-alters-migration-behaviour-in-salmon/> - This news article from Griffith University discusses how clobazam influences salmon migration, reducing the time taken to navigate through dams, and highlights the need to understand the broader ecological impacts of pharmaceutical pollutants.
* <https://www.noahwire.com> - The article from Noah Wire Services provides a general overview of the study's findings regarding the influence of clobazam on salmon migration, though specific details within the study are more thoroughly covered by other sources like Eurasia Review and Cosmos Magazine.
* <https://www.sciencedirect.com/science/article/pii/S0003269723000548> - Unfortunately, due to access restrictions, direct linking to the journal Science article isn't feasible without subscription details. However, the study detailed in Science journal would presumably support the core findings of the research on clobazam and salmon migration.