

Agricultural contaminant impacts fish reproductive behaviour

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Guppy fish

A common growth-promoting hormone used worldwide in the cattle industry has been found to affect the sexual behaviours of fish at a very low concentration in waterways – with potentially serious ecological and evolutionary consequences.

Researchers from Monash University, in collaboration with researchers from Åbo Akademi University in Finland, have found that the steroid 17β -trenbolone – used on livestock to increase muscle growth – alters male reproductive behaviour in guppy fish (*Poecilia reticulata*).

This androgenic growth promoter is part of a group of contaminants called [endocrine disrupting chemicals](#) (EDCs) that enter the environment through a variety of sources – from discharge of household waste to agricultural run-off and industrial effluent.

Lead researcher Michael Bertram, a PhD student in the School of Biological Sciences at Monash University, said over the past few decades concern has been mounting over EDCs, and that their contamination of aquatic habitats is a serious environmental problem.

"Endocrine disrupting chemicals (EDCs) are cause for concern given their capacity to disturb the natural functioning of the endocrine (hormonal) system, often at very low concentrations, with potentially catastrophic effects.

Research until now has focussed primarily on the morphological and physiological effects of EDC exposure. For the first time, our research has shown that exposure to an environmentally realistic concentration of 17 β -trenbolone – just 22 nanograms per litre - is sufficient to alter male reproductive behaviour."

The research shows that exposure of guppy fish to 17 β -trenbolone influences the ratio of male courtship (where the female chooses her mate) to forced copulatory behaviour (sneaking), whereby the female is inseminated internally from behind and does not choose her mate. The results of his research indicated a marked increase in sneaking behaviour.

"By influencing mating success, sexual selection can profoundly affect individual populations and species, with potentially devastating long term evolutionary and ecological impacts," Bertram said.

With its widespread global distribution precipitated by numerous

deliberate and accidental introductions, the small, live-bearing freshwater guppy fish, native to South America, was ideal for investigating the effects of 17β -trenbolone, especially as they are known to inhabit waterways receiving agricultural waste.

Bertram said that by illustrating the capacity of the agricultural contaminant to alter [reproductive behaviour](#), the research demonstrated the possibility of widespread disruption of mating systems in wild populations.

The next step for the researchers will be to look at sperm viability in male guppy fish exposed to 17β -trenbolone.

The research was published in the journal *Hormones and Behavior*.

More information: "Sex in troubled waters: Widespread agricultural contaminant disrupts reproductive behaviour in fish," *Hormones and Behavior*, Volume 70, April 2015, Pages 85-91, ISSN 0018-506X, [dx.doi.org/10.1016/j.yhbeh.2015.03.002](https://doi.org/10.1016/j.yhbeh.2015.03.002)

Provided by Monash University

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