

# The colour of love: Zebrafish perform colorful courtship displays

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Billy Ocean may not have been thinking of fish when he wrote "The Color of Love", but Sophie Hutter, Attila Hettyey, Dustin Penn, and Sarah Zala from the Konrad Lorenz Institute of Ethology of the University of Veterinary Medicine, Vienna were able to show that zebrafish males and females both wear their brightest colors while wooing a mate.

Elaborate secondary sexual displays are often overlooked because many species attract mates through sensory modalities imperceptible to humans, including ultraviolet light, ultrasound, [electrical signals](#), or pheromones. Also, sexual coloration may only be expressed briefly during courtship (ephemeral courtship dichromatisms) to avoid attracting predators. Zebrafish (*Danio rerio*) are a widely studied [model organism](#), though there have been few studies on their mating behaviour. Like many [schooling fish](#), zebrafish do not appear sexually dichromatic to humans; there are no obvious differences in the colour of males and females. Previous studies suggest that colour and [stripe patterns](#) influence their social and [reproductive behaviour](#), but surprisingly, body colouration has not been quantitatively studied before in this fish.

The researchers studied sexually mature wild-derived zebrafish and a domesticated strain to compare the sexes and the two populations both in the morning, when mating and spawning occur, and again later in the day, when the fish only shoal. To assess the colour properties the scientists used non-[invasive techniques](#) such as digital photography, computer software and human observations and they photographed the

fish in the water, while interacting with each other. The photographs allowed them to analyse hue, saturation, and brightness and to obtain numerical estimates of three colour properties.

They found that both males and females changed their colour (dark and light stripes) only during spawning, and that some sex differences in stripes were larger or only became apparent during this time. They also observed that individual males that appeared more colourful and conspicuous to the human eye engaged in courtship more often than less conspicuous males. These observations support the hypothesis that body colouration plays a role in the courtship and mating behaviour of zebrafish.

Both wild-derived and the laboratory strain of zebrafish showed this ephemeral dichromatism, but there were differences in the colour properties of the two populations, and reduced individual variation in the laboratory strain.

Further studies are needed to determine the underlying mechanisms and signalling functions of fleeting different colour expressions in zebrafish. Genetic analyses could help explain individual variation in nuptial colouration and provide insights into the evolutionary functions of this sexual dichromatism.

**More information:** The article "Ephemeral sexual dichromatism in zebrafish (*Danio rerio*)" by Sophie Hutter, Attila Hettiyey, Dustin Penn, and Sarah Zala is published in the current issue of the journal "*Ethology*" (Vol. 118 (2012): 1208). [onlinelibrary.wiley.com/doi/10.1111/eth.12027/abstract](http://onlinelibrary.wiley.com/doi/10.1111/eth.12027/abstract)

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