

Conservation Behaviour

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November 25th, 2022

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Overview

- 1. Introduction definitions
- 2. Thermal and salinity tolerance: killifish vs mosquitofish (DECAGON)
- 3. Behavioural interactions between killifish and mosquitofish (DECAGON)
- 4. Effects of turbidity on the behaviour of a native minnow
- 5. Behavioural effects of turbidity: killifish vs mosquitofish (AFRESH)
- 6. Future perspectives

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Introduction - definitions

Behaviour refers to animal responses to stimuli (external or internal) and includes all the ways animals interact with one another and with the environment

Ethology \rightarrow the scientific study of animal behaviour (in the light of evolution)

Conservation aims to prevent biodiversity loss and mitigate the impact of anthropogenic pressures

Lack of knowledge of key behavioural characteristics of the target species can lead to problems in the implementation of conservation plans



Conservation behaviour: the application of ethology to biodiversity conservation efforts



Thermal test

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32 Killifish (Valencia robertae)
32 Mosquitofish (Gambusia holbrooki)
Temperature ramp: 1 °C / 5 min

Salinity test

11 Killifish12 MosquitofishSalinity ramp: 10 ‰ / h

Behavioural endpoints (for removal and end of test): Loss of equilibrium or loss of swimming balance.





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Thermal and salinity tolerance of a Mediterranean killifish and the alien mosquitofish

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Poster Session 2, July 29, 2021, 17:45 - 18:30

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Behavioural interactions between killifish and mosquitofish (DECAGON)

29 Pairs of Valencia letourneuxi and Gambusia holbrooki \rightarrow in 3 consecutive phases:

60-min acclimation

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- 1. In an empty tank (15 min) 5-min interval
- 2. In the presence of artificial cover (15 min) 5-min interval
- 3. In the presence of **food** (15 min)

We measured various behaviours including aggressive and stress-related behaviours

- 2^{nd} stage \rightarrow cover use
- 3rd stage → feeding attempts



Behavioural interactions between killifish and mosquitofish (DECAGON)

The mosquitofish performed

More	Lower/less	
Nips	Latency to exit	compared to the killifish
Approaches	Time immobile	
Time following	Erratic movements	
Feeding attempts	Time under cover	

The mosquitofish appeared **bolder**, more **aggressive**, and exhibited **less stress**-related behaviours than the killifish

The killifish used the **cover** more than the mosquitofish, and did not perform any **feeding** attempts

Article submitted to Animal Behaviour by Kapakos et al. (2022)

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Natural (e.g. flash floods)

Turbidity

Impacts expected to intensify!

Human-induced (e.g. quarries)





70 *Pelasgus stymphalicus*, a native minnow with 'least concern' status

→ model for other more vulnerable congeners (e.g. *Pelasgus laconicus*) and other small-sized cyprinids

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Three tests conducted in succession:

5-min acclimation

- 1. Emergence test (5 min)
- 2. Open field test (5 min)

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3. Predator response test (3 + 3 min)

Two turbidity levels Clear: 0 NTU Turbid: 30 NTU

Behavioural measures:

- Time to exit
- Activity & exploration
- Time immobile
- Time in the centre
- Dashing/erratic behaviour





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GLM: Activity ~ Turbidity treatment + Stimulus addition

GLM: Time in the centre ~ Turbidity treatment

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Turbidity and predation risk: behavioural responses of a freshwater minnow



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Two tests conducted in succession:

2-min acclimation

- 1. Open field test (5 min) 2-min interval
- 2. Sociability test (5 min)

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Two turbidity levels Clear: 0 NTU Turbid: 30 NTU

Behavioural measures:

- Activity & exploration
- Time immobile
- Time in the centre
- Time shoaling
- Dashing/erratic behaviour





Activity

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Wall touching



Erratic behaviour



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Future perspectives

Comparative (killifish – mosquitofish) and new species studies

Behavioural tests

- Emergence test
- Predator response test
- Novel object test

Environmental factors

- Temperature
- Salinity

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• Turbidity



Thank you for your attention!



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