The Effects of Oil Exposure on the Behavioral Lateralization of Bicolor Damselfish (Stegastes partitus)

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Introduction

- The Deepwater Horizon oil spill in April 2010 released over 4.9 million barrels of oil into the Gulf of Mexico1,2
- 31% of oil was integrated into the sediments where bottom-dwelling reef fish, such as bicolor damselfish (Stegastes partitus) live3,4
- Behavioral lateralization is when an animal shows a preference for one side of their body5
  - Such as right- or left-handedness in humans
- This study examines the effects that source crude oil exposure has on the lateralization of damselfish

Methods

- Bicolor damselfish were placed in an exposure tank 24 hours before testing
  - 1 g of unweathered crude oil was blended with 1 L of seawater to produce the high-energy water accommodation fraction (HEWAF)
  - Tanks contained a 0.75% HEWAF dilution in seawater (n=6) or control seawater (n=8)
- A detour test, consisting of a two-way T maze, was used to test behavioral lateralization to evaluate whether oil-exposure effects reflexive behavior6
- Fish were guided down the center runway and were forced to make a choice to turn left or right
  - This procedure was repeated 20 times

Results

- Relative lateralization scores, LR, allow for comparisons to be made about the overall turning bias of a population
- Absolute lateralization scores, LA, evaluate turning bias on the individual level and show the strength of lateralization, disregarding the specific turn direction

Conclusions

- Our results lead us to conclude that oil exposure has no effect on the behavior lateralization of this species
- Wild animals have been observed to show a wide range of lateralization scores; it is not uncommon to find little or no evidence of this behavior7

Future Directions

- To get a better representation of the behavior of a group, it is important to have a higher number of test subjects
- Future studies should further explore the effect of crude oil on the CNS and behavioral lateralization of bicolor damselfish with higher sample sizes

References


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