

Lateralisation of Visual Function in Yellow-Eyed Mullet (*Aldrichetta forsteri*) and Its Role in Schooling Behaviour

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Abstract : Lateralisation of cognitive function is a common phenomenon found throughout the animal kingdom. Strong biases in functional behaviours have evolved from asymmetrical brain hemispheres which differ in structure and/or cognitive function. In fish, lateralisation is involved in visually mediated behaviours such as schooling, predator avoidance, and foraging, and is considered to have a direct impact on species fitness. Currently, there is very little literature on the role of lateralisation in fish schools. The yellow-eyed mullet (*Aldrichetta forsteri*), is an estuarine and coastal species found commonly throughout temperate regions of Australia and New Zealand. This study sought to quantify visually mediated behaviours in yellow-eyed mullet to identify the significance of lateralisation, and the factors which influence functional behaviours in schooling fish. Our approach to study design was to conduct a series of tank based experiments investigating; a) individual and population level lateralisation, b) schooling behaviour, and d) optic lobe anatomy. Yellow-eyed mullet showed individual variation in direction and strength of lateralisation in juveniles, and trait specific spatial positioning within the school was evidenced in strongly lateralised fish. In combination with observed differences in schooling behaviour, the possibility of ontogenetic plasticity in both behavioural lateralisation and optic lobe morphology in adults is suggested. These findings highlight the need for research into the genetic and environmental factors (epigenetics) which drive functional behaviours such as schooling, feeding and aggression. Improved knowledge on collective behaviour could have significant benefits to captive rearing programmes through improved culture techniques and will add to the limited body of knowledge on the complex ecophysiological interactions present in our inshore fisheries.

Keywords : cerebral asymmetry, fisheries, schooling, visual bias

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