Mimicry in juvenile wrasses: ecological and behavioural aspects of a *Coris-Amphiprion* relationship in the northern Red Sea

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Abstract. Evidence of mimicry in the literature is often anecdotal and based on general resemblances and observer intuition. Every case of mimicry is unique and has to be proved based on certain ecological characteristics that apply to all real mimic-model relationships. The present study hypothesises that the colour similarities of juveniles of the wrasse species *Coris cuvieri* (Bennett, 1831) to the Anemone fish *Amphiprion bicinctus* Rüppell, 1830 in the northern Red Sea represents a real case of mimicry. *C. cuvieri* takes advantage of its conspicuous colouration (as resembling Anemone fish) in order to avoid possible predators. This study examines the ecological and behavioural relationship between the mimicking species *C. cuvieri* and its model *A. bicinctus* in the Gulf of Aqaba. Juveniles mimic the colouration of Anemone fish throughout the geographic range of the wrasse. Mimics and models occupy the same habitats and prefer the same depths and reef zones. The wrasse undergoes a transition from the juvenile (mimetic) colouration to the adult species-specific (non-mimetic) colouration when they reach a critical size (the maximum size of the Anemone fish). As typical of mimic-model relationships, mimic wrasses were always less abundant than their model. Mimics were found in loose association with Anemone fish and spatial variation in the abundance of mimics was correlated with models, while the abundance of other wrasses was not. Juvenile wrasses gain a foraging advantage by mimicking Anemone fish which is explained by the decrease of the predation risk and the deception of competitors. Predators recognise the typical Anemone fish colouration and learn not to attack as they experience low catch-per-unit success rates.

Key words. Adaptive colouration, Anemone fish, African *Coris*, Coral reef fish, protective resemblance, Egypt, Middle East.

Introduction

The study of mimicry phenomena, where one species evolves to closely resemble another, began in the 19th century with most of the theories developed on insects (BATES 1862, MÜLLER 1879, PECKHAM 1889). Although the most spectacular and best known cases of mimicry are found among other classes, there are approximately 60 reported cases in coral reef fishes (RANDALL 2005). Due to the high density of predators and competitors in reefs, coral fishes are forced to develop new survival strategies. Mimicry, as well as other protective colourations, is a common strategy in wrasses. False eye spots, colouration, shape and behaviour of many species are adapted to a model (THALER 1997). A large number of coral reef fish exhibit a juvenile colouration that is distinct from adults. In many of these cases, the colour function (mimicry, crypsis, aposematic or disruptive colouration, inter- or intraspecific communication) remains unclear (EAGLE & JONES 2004, MOLAND & JONES 2004). Mimicry is difficult to prove unless the mimic gains a real advantage from the resemblance and / or association with the model.

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