

“Swallowing it all” – Extreme ingestion capability of juvenile reef fish

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Abstract: During a predation event a juvenile grouper, rock hind *Epinephelus adscensionis*, fed upon the redlip blenny *Ophioblennius trinitatis*. It is important to highlight that both individuals had pretty much the same size during the predation event (around 5 cm); however, the grouper ingested the whole prey.
Keywords: Feeding behavior, Piscivory, Reef Fish, Atlantic Ocean.

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Resumo: Durante um evento de predação um indivíduo juvenil de *Epinephelus adscensionis* (peixe-gato) alimentou-se de *Ophioblennius trinitatis* (macaquinho). É importante destacar que ambos os peixes apresentavam praticamente o mesmo tamanho (aproximadamente 5 cm); no entanto, a garoupa engoliu a presa inteira.
Palavras-chave: Comportamento alimentar, Piscivoria, Peixes recifais, Oceano Atlântico.

Introduction

A reduced number of animals have the ingestion capability to swallow a whole prey, in just one trial, during their juvenile life phase (Hampton 2014). This behaviour needs to be associated with a series of morphological and anatomical features such as gape size, stomach dilatation, quantity and quality of digestive enzymes (Richard & Wainwright 1995). Despite the fact that this behaviour can be considered rare for juveniles, it has already been recorded for reptiles, birds and fishes (Rodríguez-Robles 2002).

Piscivorous reef fishes are defined as the ones that feed most on live fishes. This trophic guild is proportionally better represented in high latitudes due to a decrease in the abundance of other groups such as herbivores and planktivores (Ferreira et al. 2004). Moreover, their life cycle characteristics (e.g. long life span, ontogenetic migrations) and reproduction (e.g. sex inversion) make them highly vulnerable to even low levels of exploitation (Sadovy 2001).

Epinephelus adscensionis, rock hind, is a solitary grouper (Family Epinephelidae) that inhabits rocky reefs in the Western Atlantic Ocean (Nelson 2006). It is characterized by a medium body size grouper (maximum 50.0 cm total length) with bases of soft dorsal and anal fins covered with scales and thick skin. Also, 2 or 3 dark saddles along base of dorsal fin and another on top of caudal peduncle and red spots on head, body and fins, spots becoming larger ventrally (Smith 1997; Nelson 2006).

Ontogenetic diet changes have been already recorded for piscivorous fish and also for the *Epinephelus* genus (Machado et al. 2008), such as for another reef fishes trophic guilds (Pereira

& Ferreira 2013). These diet changes according to ontogeny are normally useful to minimize energetic cost, predation risk and diet overlap; in contrast, increase species growth rates.

Material and Methods

The predation event recorded herein was observed in Northeast Brazil macroalgal beds adjacent to coral reefs (Tamandaré municipality – 8°44'26" S and 35°05'11" W) during the summer of 2011. These macroalgal beds are mainly composed by *Sargassum polyceratum*, *Dictyopteria delicatula* and *Canistrocarpus cervicornis* and are recognised nursery and feeding grounds for different reef fishes (Chaves et al. 2013). The observation was performed by snorkelling during the morning (09:00 – 11:00) in depth average of 2 m.

Results and Discussion

During the observation, a juvenile grouper, rock hind *Epinephelus adscensionis*, fed upon the redlip blenny *Ophioblennius trinitatis* (endemic Brazilian cryptobenthic species). The ingestion process was observed and took approximately 5 minutes from the first strike until the final tail ingestion. Before the attack, the prey was observed swimming close to the predator without any sign of debilitation what emphasise the predator hunting skills. The rock hind, *Epinephelus adscensionis*, was camouflaged around an algae bottom and attacked the redlip blenny *Ophioblennius trinitatis* in an extremely fast movement once it approached. It is important to highlight that both individuals had pretty much the same size during the predation event (around 5 cm);

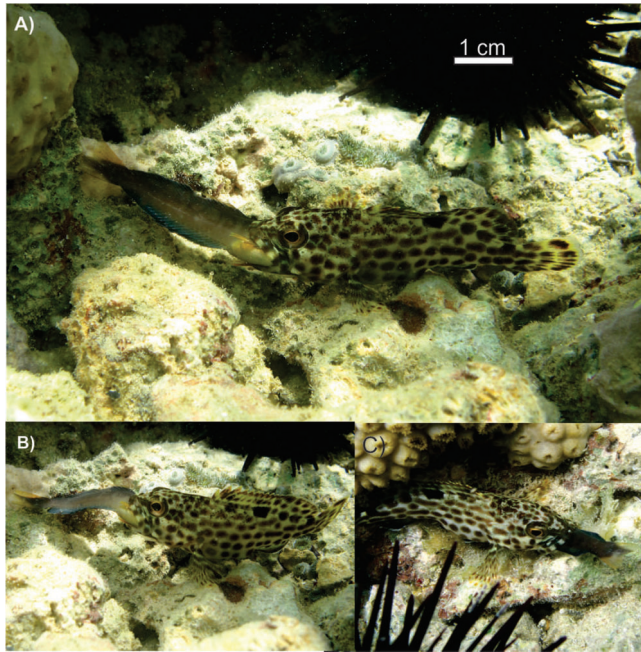


Figure 1. Predation event recorded on Northeast Brazil macroalgal beds when a juvenile grouper (around 5.0 cm), *Epinephelus adscensionis*, ingested the whole redlip blenny (around 4.5 cm), *Ophioblennius trinitatis* in just one trial. The feeding behaviour started from the head (Figure 1A) continuous towards the body (Figure 1B) and then the grouper swallowed the whole fish (Figure 1 C). Size scales are presented in the figure.

however, the juvenile grouper ingested the whole prey. The feeding behaviour started from the head (Figure 1A) continuous towards the body (Figure 1B) and then the grouper swallowed the whole fish (Figure 1 C).

Epinephelus adscensionis individuals are characterized as an ambush predator, displaying a “sit and wait” feeding behaviour. This behaviour is normally associated with low mobility and high camouflage capability. Therefore, the predation event observed herein supports this behaviour for the *Epinephelus* genus also during juvenile life phase when the rock hind ingested the whole redlip blenny in just one trial.

The rock hind diet is composed mainly by crabs (66.70%) and fishes (20.1%); and they can also include young sea turtles in their diet (Randall 1967, Coelho 2012). Nevertheless, the diet of *E. adscensionis* during juvenile life phase is still unclear, despite the fact that crabs are normally found on their stomachs (Randall 1967).

Ontogenetic changes in habitat use are also known for *E. adscensionis*. Juveniles are more abundant associated with macroalgal beds (Chaves et al. 2013); in contrast adults are common in deeper waters connected with coral reefs (author personal observation). Therefore, these habitat use modification according to ontogeny can also be relevant for *E.*

adscensionis and other reef fishes, reducing their predation risk and also increasing feeding rates (Brown et al. 2002).

The plasticity of the feeding event reported herein highlight ontogenetic diet changes on piscivorous reef fishes as well as already observed for the *Epinephelus* genus (López & Orvay 2005, Machado et al. 2008, Coelho 2012). Furthermore, the extreme ingestion capability of juvenile piscivorous reef fish needs to be better investigated regarding its anatomical and morphological characteristics.

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