

PRE-SPAWNING SNOOT-GRIPPING BEHAVIORS OF *GYMNOTHORAX PICTUS* AND *GYMNOTHORAX THYRSOIDEUS* (MURAENIDAE) IN CAPTIVITY

Kar-Hoe Loh¹ and Hong-Ming Chen^{2, 3}

Key words: Anguilliformes, moray eel, snout gripping, pre-spawning behavior, courtship.

ABSTRACT

The main focus of this study has been on the distinctive pre-spawning snout-gripping behaviors and mate choice of two moray species (*Gymnothorax pictus* and *G. thyrsoideus*). The behavior of snout-gripping means that the male grips the female's snout with its jaws. It is the most distinctive behavior to confirm the success of mating pair formation naturally and was rarely described on moray eels or other coral reef fishes. The reproductive behaviors of the two moray species were also first observed and photographed in the laboratory aquaria. Over 22 reproductive events including 9 spawning events by 28 adult individuals of *G. pictus* were recorded. Eight sequential behaviors were recorded in the successful spawning events of *G. pictus* searching, courting, inviting, snout-gripping, rushing toward the water surface, turning around, spawning, separating and settling to the bottom. *G. thyrsoideus* also exhibited similar pre-spawning behaviors as *G. pictus*, but showed more aggressive behaviors between the males than *G. pictus*. Courtships and mating affairs occurred about 23 times by 32 adult individuals of *G. thyrsoideus*, but without spawning. Both species mated mainly between a female and a male at night (8:00PM-2:00AM). It only took a shorter time for *G. pictus* to go from snout-gripping to spawning (3-7 seconds), but a longer time for *G. thyrsoideus* to go from snout-gripping to separating (35-43 seconds).

I. INTRODUCTION

Any behavior is distinctive if it is performed without being based upon prior experience and therefore is an expression of innate biological factors, it was different from the imprinting (Wiens and Lorenz, 1952; Eckhard, 1958). The behaviors of Anguilliformes fishes are wonderful; they have a special extension body and raptorial jaws (Mehta and Wainwright, 2007; Tomohiro et al., 2015). Some special behaviors that were observed during feeding sequences of muraenid eels include: knot, rotate, shake and strike (Miller, 1987; 1989).

Moray eels are extremely secretive, wary of divers, and may spawn infrequently (Kris 2003). The reproductive behavior and spawning behavior of moray eels were less documented and confirmed visually (Adler, 1975; Thresher, 1984). Apparent reproductive behaviors were observed in the field only in four occasions (Brock, 1972, Moyer and Zaiser, 1982; Ferraris, 1985) (Table 1). These observations in the order presented, represent a probable spawning sequence. That is, the eels approach each other, rise up face to face, entwine their bodies, return to the substrate with bodies still entwined and after some time, spawn with abdomens pressed together.

The reproductive behavior of moray eels can be as a pair in some species such as in *Gymnothorax javanicus*. It was observed that this species would be lying on the bottom and entwined around one another, but no visible gamete released was apparent (Brock, 1972). Moyer and Zaiser (1982) reported that a pair of *Gymnothorax kidako* was similarly entwined, and one turned to wrap itself around the other. On the contrary, *Uropterygius necturus* just prior to spawning was seen with three males grasping the female just behind the head and within a few minutes the group dispersed (Moyer and Zaiser, 1982). Ferraris (1985) reported that a group of spawning *G. herrei* in the Philippines showed seven males holding onto a single female. The mass of bodies then began to rise above the substrate. This activity was apparently initiated by the female, whose head extended slightly above those of the males.

In the present study, due to the paucity of information on the reproductive behavior of moray eels, we reared peppered morays

Paper submitted 01/10/17; revised 06/22/17; accepted 09/01/17. Author for correspondence: Hong-Ming Chen (e-mail address: hmchen@mail.ntou.edu.tw).

¹ Institute of Ocean and Earth Sciences, University of Malaya, Kuala Lumpur 50603, Malaysia.

² Department of Aquaculture, National Taiwan Ocean University, Keelung, Taiwan, R.O.C.

³ Center of Excellence for the Oceans, National Taiwan Ocean University, Keelung, Taiwan, R.O.C.