

Short note/ Kurze Mitteilung

Predatory attack on spawn of damselfish by parrotfish in the Caribbean

Räuberische Angriffe von Papageifischen auf Laich von Riffbarschen in der Karibik

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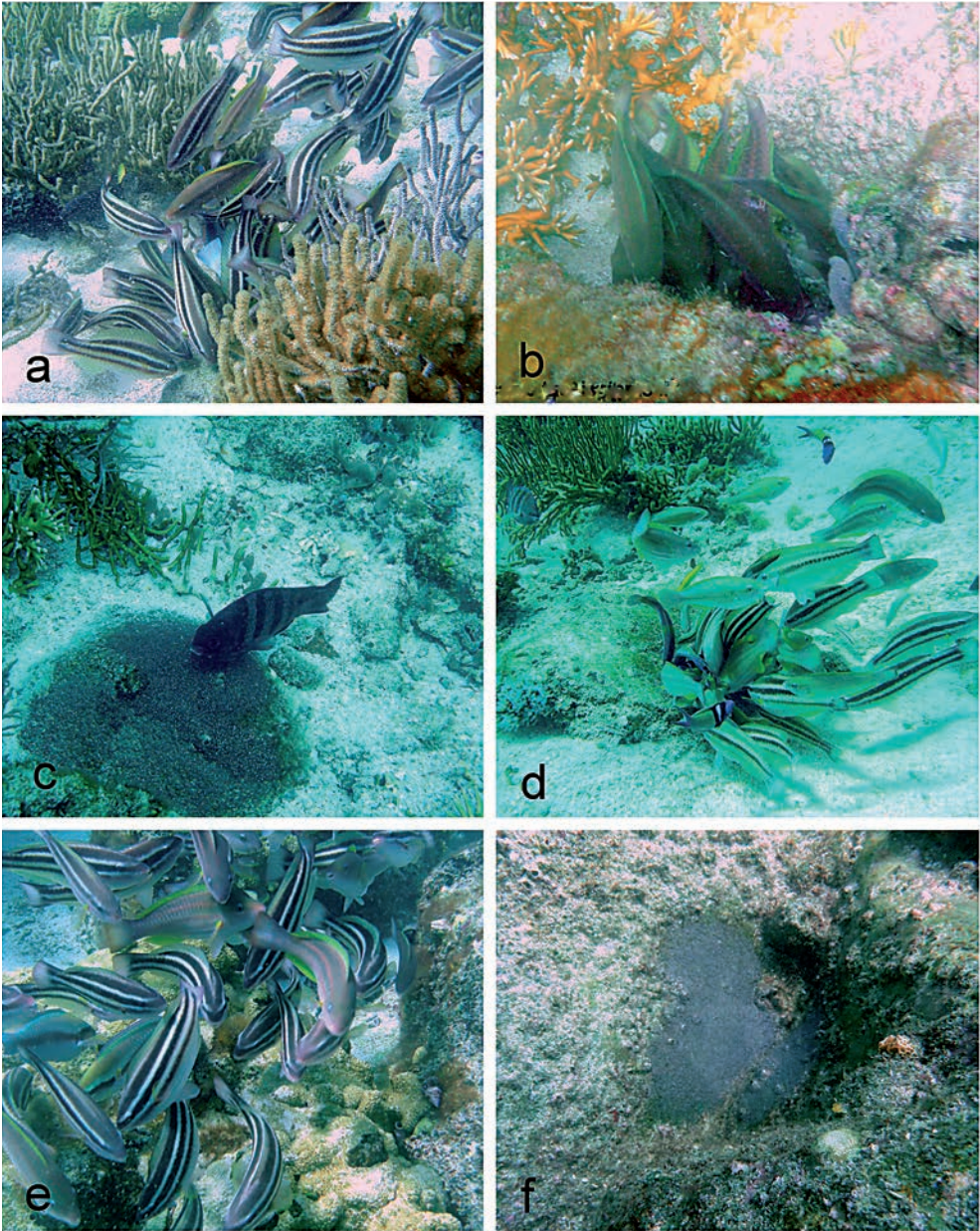
Zusammenfassung: Im Korallenriff der Insel Margarita (Karibik, Venezuela) wurden wiederholt Fälle von Laichräuberei durch Prinzess-Papageifische (*Scarus taeniopterus*, Scaridae) beobachtet. Opfer waren die Laichnester des Sergeanten *Abudefduf saxatilis* (Pomacentridae). Diese befinden sich auf schwarzem, vulkanischem Untergrund, den die Männchen des Riffbarsches von allem Aufwuchs befreien. So entstehen besonders auffällige Areale von etwa 15 cm im Durchmesser, auf dem die angelockten Weibchen laichen und die Männchen das Gelege bewachen. Herumstreuende junge *S. taeniopterus*, die diese Nester entdecken, stürzen sich auf den Laich und locken durch dieses Verhalten weitere Artgenossen an. Auf Grund solcher Massenansammlung stehen die Laichräuber senkrecht am Laichplatz; das Sergeant-Männchen wird vertrieben. Es handelt sich hier offenbar um Lernvorgänge, denn Auslösereiz für *S. taeniopterus* ist offensichtlich der schwarze Laichplatz von *A. saxatilis*.

Several observations in the coral reefs at the Isle of Margarita, Caribbean, Venezuela, in November 2013 were conspicuous by situations as seen in figures 1 a, b, d, and e. These are assemblages of the parrotfish *Scarus taeniopterus*, which push down with the head to the substrate. The assemblies consisted mainly of juveniles, but also of some individuals of the initial phase (fig. 1 b), of few adults (fig. 1 e) and rarely of labrids like *Thalassoma bifasciatum* (fig. 1 e). This phenomenon proved to be attacks by the parrotfish on the special spawning places of the damselfish *Abudefduf saxatilis* (Pomacentridae), which lie directly on the bottoms. The area of about 15 cm diameter was prepared by the male which removes all epiphyton until the clean black substrate of volcanic origin appears (fig. 1 c). Damselfish females are attracted by the males in order to spawn on this place; the males care for the inseminated eggs thereafter.

The attacks occur mainly by young princess parrotfish which are roving through the reefs in loose shoals. It is to assume that the conspicuous spawning places of the damselfish were detected accidentally by some parrotfish which

immediately attack the nest. This behavior may be the releaser for other individuals to join the leading conspecifics until they become so numerous that they can expel the damselfish male from its nest, solely by their massive appearance (figs 1 d, e). The male damselfish has to watch the event from a certain distance without having a chance to save its spawn (fig. 1 d). After the eggs are fed on the parrotfish leave this place as a clean black area and also leaves the *A. saxatilis* male (fig. 1 f).

Generally, the princess parrotfish are, as several other parrotfish species, grazers of algae, which they scrape off from corals and rocks (MUMBY 2009). Therefore, they play an important role in the reefs as cleaners of corals which thus become the opportunity to exist and grow. It is very apparent that the behavior to attack spawning places is not inherited. In contrast this behavior is learned especially by conspecifics. According to LORENZ (1973) learning is an adaptive modification of behavior. A more actual theory of learning describes that inherited concepts or patterns exist in the brain which are activated by special impressions of



Figs 1 a-f: Predatory attacks of parrotfish on spawning places of the damselfish *Abudedefduf saxatilis*. **a** Young princess parrotfish (*Scarus taeniopterus*) enter the spawning place of the damselfish. **b** First, *S. taeniopterus* accumulate at a nest of the damselfish. **c** Male of *A. saxatilis* at its nest on the volcanic bottom caring for the spawn. **d** Attack of young *S. taeniopterus* on the nest of *A. saxatilis* and expulsion of the male damselfish (to see in the upper left corner). **e** Aggregation of young parrotfish, to which a specimen of the wrasse *Thalassoma bifasciatum* is joined. **f** The last phase of parrotfish attack leaves a clean black place without the damselfish male.

Abb. 1 a-f: Räuberische Angriffe von Papageifischen auf Laichplätze des Riffbarsches *Abudedefduf saxatilis*. **a** Junge Prinzess-Papageifische (*Scarus taeniopterus*) erobern den Laichplatz des Riffbarsches. **b** *S. taeniopterus*

the environment and improve by repetitions its memory (MAUSFELD 2001). The process of optical learning is here initiated by other princess parrotfish which are already experienced and search for the conspicuous spawning places of *A. saxatilis*. The increasing aggregation is a second releaser which enhances the motivation (BECKER-CARUS et al. 1972, RHEINBERG 2006) of other specimen in order to gain an easy attainable prey. These two releasers can act together or independently when the black nests are invisible because the parrotfish aggregation is too dense. From an ecological view this behavior is a case of optimal foraging (MACARTHUR & PIANKA 1966). According to the theorems of CHARNOV (1976) and PARKER & STUART (1976) the foraging success depends from searching efficiency and motivation. The massive crowding of the parrotfish leads to the vertical position when preying which enables utmost individuals to participate of the meal. The final act of this event, which lasts less than one minute, is an empty spawning place; the parrot fish leave this area as does the damselfish male. A vertical position but head up present *S. taeniopterus* also at sunset. DUBIN & BAKER (1982) explain this behavior with the parrotfish getting so a better overview on the surrounding environment.

It is clear that these observations are not generally valid for the Caribbean or the Isle of Margarita. But attacks on and plundering of nests of *A. saxatilis* were observed at Margarita several times. The several attacks presented in figure 1 were documented from different nests at different times. It is to assume that on bottoms with more cryptic nests of the damselfish the spawning places cannot so easily be detected as on the black bottoms, otherwise the population of the damselfish would be strongly endangered.

Therefore, here two stimuli provide motivation of the young princess parrotfish which

increase by time in order to gain an easy attainable prey. This is an important factor for every predator in order to economize its energy budget (MACARTHUR & PIANKA 1966, CHARNOV 1976, ZANDER 2013).

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der initialen Phase sammeln sich an einem Laichplatz des Riffbarsches. **c** Ein Männchen von *A. saxatilis* an seinem Nest auf dem schwarzen vulkanischen Untergrund, das sich um den Laich kümmert. **d** Angriff junger *S. taeniopterus* auf ein Nest von *A. saxatilis* und Vertreibung des Riffbarschmännchens (sichtbar in der oberen linken Ecke). **e** Ansammlung junger Papageifische, zu denen sich der Lippfisch *Thalassoma bifasciatum* gesellte. **f** Die letzte Phase der Papageifischattacke hinterlässt einen gesäuberten schwarzen Platz ohne ein Riffbarschmännchen.

