

# Circling and touching: two new behaviours in the courtship of the Picasso triggerfish *Rhinecanthus aculeatus* (Linnaeus, 1758)

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The reproduction of *Rhinecanthus aculeatus* (Linnaeus, 1758), a tropical Indo-Pacific reef fish, occurs around the full and new moon (Kuwamura 1997). Spawning begins 16 to 45 min before the sunrise. The courtships begin 7 to 27 min before the spawning. A specific behaviour of the courtships is when the male places its rostrum against the caudal peduncle of the female (Kuwamura 1997).

Observations have been recorded in the lagoon of Tiahura [shallow sandy area (0.5 - 2 m deep) with algae *Hypnea spinella* (C.Agardh) Kützing, 1847 - Moorea, French Polynesia; 17°29'27" S, 149°53'32"O] in March and April 2015. Fifteen *R. aculeatus* (five males and ten females) lived in this area where the males have territories, which included the sub-

territories of the females. During video-recorded courtships, in addition to the behaviour described by Kuwamura (the nuzzling), two new behaviours have been observed: circling and touching. During the circling, the male and the female swim to the surface in progressively larger circles (Fig. 1). The circling behaviour has been observed in other Balistidae such as *Pseudobalistes flavimarginatus* (Rüppell, 1829) and *Balistapus undulatus* (Park, 1797) (Lobel and Johannes 1980). During the touching, the abdomens of the male and the female's touch each other without gametes emission (Fig. 2). The touching has been reported for *Xanthichthys mento* (Jordan and Gilbert 1882) (Kawase 2003).

Although Balistidae present different reproductive strategies, they have common reproduction features, such as the time and the day of hatching and spawning (Kawase 2003). Our observations are innovative because the courtship of *R. aculeatus* is more complicated than previously described. This result suggests, thus, that Balistidae have also some common courtship behaviour features. These behaviours may facilitate the release of gametes, as with the nuzzling (Kuwamura 1997) or can convince the partner to mate. We do not know if these patterns are phylogenetically related. But as the egg care strategy of Balistidae (bi-parental vs maternal) appears to be related to the distribution of food and breeding sites, more than by the phylogeny (Kuwamura 1997), more studies on this topic will be useful to better understand the establishment of these behaviours.

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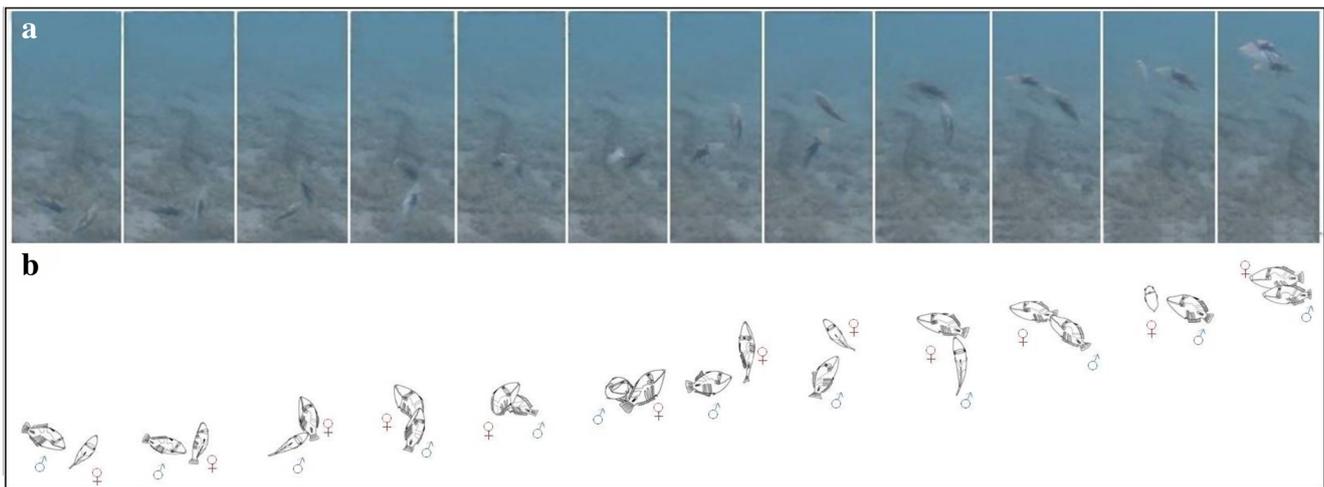
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**Fig. 1** **a** Temporal pictures of the circling behaviour of two *Rhinecanthus aculeatus*, and **b** Schematic representation of the circling behaviour of two *R. aculeatus*



**Fig. 2** Touching of two *Rhinecanthus aculeatus*. The male is at the right and the female at the left

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