

Cleaning activity among Labridae in the Azores: the rainbow wrasse *Coris julis* and the Azorean blue wrasse *Centrolabrus caeruleus*

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*Cleaning interactions among the rainbow wrasse *Coris julis* and the azorean blue wrasse *Centrolabrus caeruleus* are presented with photographic registers, as well as the first record of the latter cleaning conspecifics from Azorean shallow rocky reefs.*

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Cleaning interactions involve small fish (the cleaners) which remove ectoparasites and other parasites from the body of (generally) larger, cooperating fish clients (Feder, 1966). Such interactions usually occur at traditional sites (Youngbluth, 1968), thus facilitating the repeated location of cleaners by clients, and might even act as 'safe havens' in which predatory interactions are diminished as observed by Cheney *et al.* (2008). Cleaners are also thought to share common colour patterns, which may help clients to recognize them.

Most of the important cleaning activities developed by fish and ecological studies of this mutualism relationship on reefs are reported from shallow tropical waters (Feitoza *et al.*, 2002, 2003; Sazima *et al.*, 2005; Coni *et al.*, 2007; Gasparini *et al.*, 2007; Sikkil *et al.*, 2008; Soares *et al.*, 2008) and little is known from temperate waters (see Van Tassell *et al.*, 1994; Henriques & Almada, 1997; Côté, 2000), which is attributed to the lack of research on temperate waters.

The rainbow wrasse, *Coris julis* (Linnaeus, 1758) is a small rocky shore fish that inhabits shallow waters and is site-attached throughout its adult life. Moreover, this protogynous hermaphroditic species (with diandry) is distributed in a very large and heterogeneous geographical area (Mediterranean Sea, southern Black Sea, north-eastern Atlantic from Sweden to south of Cape Lopez, Gabon, including the Azores, Madeira and the Canary Islands) (Porteiro *et al.*, 1996) and it presents conspicuous morphological variations between populations.

The Azorean blue wrasse, *Centrolabrus caeruleus* Azevedo, 1999, an endemic rocky shore fish that inhabits shallow waters in the Azores, was recently distinguished from *Centrolabrus*

trutta, a species that inhabits Madeira and presumably Canary and Cape Verde (Azevedo, 1999; Azevedo *et al.*, 1999).

Our diurnal observations took place at Corvo Island (39°40'N 31°04'W), during a free diving in an open tidal pool area, 19 August, from 1400 to 1530 hours, where two cleaning stations were detected, 50 m apart, exposed to depths from 2 to 4 m.

The cleaning processes observed always started by the client, *C. caeruleus*, positioning close to 90° head-up (Figure 1) 30 cm from the bottom, near a boulder (1 m high) over a dark brown sand bottom. All fins were fully extended and no colour change was displayed by the client. It was noticed that the great majority of *C. caeruleus* observed in this pool had different degrees of damaged tissue (Figure 2), but no parasites were evident. One or two *C. julis* were involved in the cleaning stations and 1–5 clients were observed posing simultaneously. Clients (10–15 cm total length (TL)) were not much larger than the cleaners (8–10 cm TL).

In a single opportunity, five *C. caeruleus* (10–15 cm TL) were posing, and as no *C. julis* approached, a single *C. caeruleus* (7 cm TL) started cleaning the conspecifics. Such a bout lasted less than 15 seconds. Although no photographic registers were possible, the present study is the first record of this endemic and poorly known wrasse performing cleaning activities.

Centrolabrus caeruleus are particularly shy, and by the time *C. julis* stopped cleaning, they went to the algae turfs of *Asparagopsis armata* Harvey, 1855, where especially juveniles are commonly observed swimming around (Figure 3).

Although *C. julis* juveniles (3–5 cm) were present in the cleaning station (Figure 4), none attempted to clean the posing clients.

Among the alternative short-distance signals to attract clients, which may include colour, other visual signals such as cleanerfish dances, or physical contact between cleaner

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Fig. 1. Cleaning activity involving the Azorean endemic *Centrolabrus caeruleus*, posing head-up and the rainbow wrasse *Coris julis*. Photograph: A.A. Bertoncini.



Fig. 2. *Centrolabrus caeruleus* commonly found in the pools of Corvo Island, with damaged tissue along the flanks and head. Photograph: A.A. Bertoncini.



Fig. 3. *Centrolabrus caeruleus* hiding among the algae turfs of *Asparagopsis armata*, after a cleaning event. Photograph: A.A. Bertoncini.

and client, Stummer *et al.* (2004), tested interspecific visual communication and concluded that body size and lateral stripes both affect the recognition of cleanerfish by their fish clients.

Coris julis inspected and cleaned the clients' body for short intervals of 5 seconds, swimming around and then returning.



Fig. 4. Juvenile of *Coris julis* (4 cm), in the area of the cleaning station. Photograph: A.A. Bertoncini.

The flanks were the most explored area of the clients' bodies, where damaged tissue was evident. A similar behaviour is described for wrasses in Brazilian waters: *Halichoeres dimidiatus* (Sazima *et al.*, 1998), *H. bivittatus* (Feitoza *et al.*, 2002), *H. penrosei* (Coni *et al.*, 2007) and *Thalassoma noronhanum* (Francini-Filho *et al.*, 2000).

We believe that the cleaning activity of *C. caeruleus* is rare and opportunistic, since it is abundant in the Azores, but has never been seen as a cleaner before. On the other hand, *C. julis* was already observed cleaning *Boops boops* (Linnaeus, 1785), *Sarpa salpa* (Linnaeus, 1785) and *Sparisoma cretense* (Linnaeus, 1785), and it seemed that no fixed cleaning stations were established outside tide pools, which remains to be studied.

Although *C. caeruleus* can be considered as a facultative cleaner such as *Centrolabrus exoletus* (Linnaeus, 1785), in which picking material from the body surface of other fish is not the dominant form of feeding behaviour (see Henriques & Almada, 1997), future observations in natural conditions and detailed experiments on the ontogeny of cleaning behaviour are needed.

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