

24/7 service: nocturnal cleaning in a tropical Indo-Pacific reef

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Cleaning symbiosis encompasses a large diversity of organisms in reef systems (Côté 2000), but has been mostly recorded during the daytime. We report two instances of nocturnal cleaning by the shrimp *Urocaridella* sp. in a shipwreck at Tulamben, Bali, Indonesia. These cleaning episodes involved the pufferfish *Arothron nigropunctatus*

and the rabbitfish *Siganus stoderi* (Fig. 1) as clients. The fishes were resting near the shipwreck while the shrimp inspected them. The rabbitfish displayed its typical nocturnal coloration. Both observations were recorded around 2 h after sunset (between 08:00 – 08:30 pm), with absolutely no daylight.

Fig. 1 Cleaner shrimp *Urocaridella* sp. inspects the gill cover of the rabbitfish *Siganus stoderi*, left, and the back of the pufferfish *Arothron nigropunctatus*, right. Arrows indicate the shrimp's location



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Different from records of diurnal cleaning, in which clients pose and change colours to attract the cleaner's attention, it seems unlikely that the fish would have intentionally attracted the attention of the cleaner in the present study, as both fishes were resting. Therefore, both events seem to have occurred due to the simple presence of the fish resting next to cleaner shrimps. The scarcity of nocturnal cleaning records may be explained by the strict diurnal activity of cleaner fishes, especially wrasses (Labridae) and gobies (Gobiidae). Additionally, visual communication is an important component of interactions between cleaner fishes and clients (Cheney et al. 2009), which would restrict these interactions at night. However, as cleaner shrimps are found on tropical reefs worldwide,

and since some species are active at night and not predominately visually oriented (Debelius 2001), we suggest that this type of nocturnal cleaning occurs globally in tropical reef habitats.

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