

Cleaner host posing behavior of whitetip reef sharks (*Triaenodon obesus*) in a swarm of hyperiid amphipods

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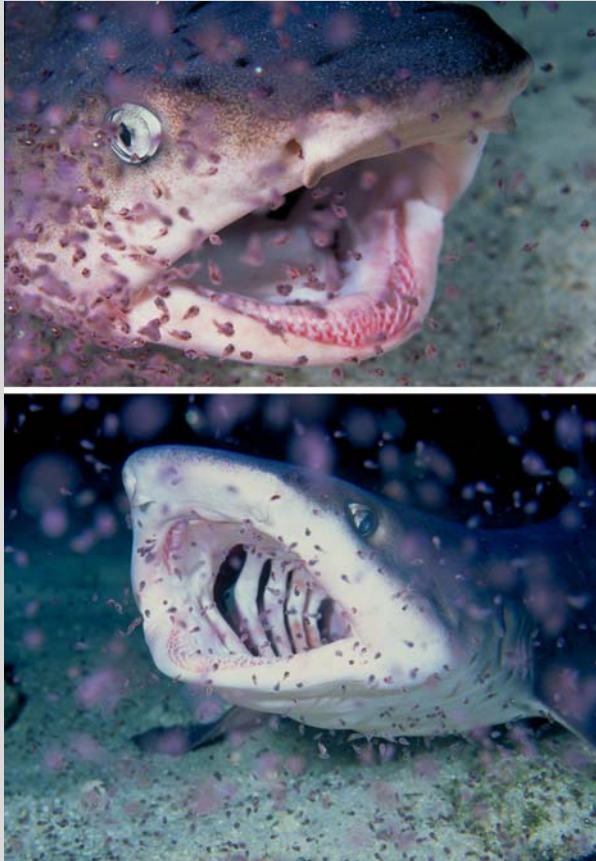


Fig. 1 A whitetip reef shark lying on the seafloor with mouth agape in a swarm of hyperiid amphipods

In February 2002, several whitetip reef sharks (*Triaenodon obesus*) were observed in a unique interaction with a swarm of hyperiid amphipods (likely *Brachyscelus* sp.) at Isla Manuelita, Cocos Islands, Costa Rica. Approximately seven sharks were lying on the seafloor in 25 m of water with their mouths widely agape while numerous amphipods filled their buccopharyngeal cavities (Fig. 1). Sharks held this position for approximately 1 min at a time before closing their mouths and resuming respiratory pumping.

Though it could not be determined whether amphipods were being swallowed, feeding is highly unlikely since whitetip reef sharks lack gill structures for filtering planktonic prey from seawater. Also, elasmobranchs that are known to filter feed do so by actively swimming through plankton.

The posing behavior shown by these sharks closely matches that described in captive lemon sharks (*Negaprion brevirostris* and *Negaprion acutidens*) being cleaned by the wrasse *Labroides dimidiatus* (Keyes 1982). Michael (1993) noted that whitetip reef sharks in Cocos Islands are cleaned by the hogfish (*Bodianus diplotaenia*) and the goby (*Elacatinus puncticulatus*), though shark posing behavior was not described. Similar open mouth and gill flaring behavior is demonstrated by large grouper (Serranidae) being cleaned (Wicksten 1998).

We propose the sharks' gaping behavior to be the result of tactile stimuli from the swarming amphipods, which the sharks associate with those of cleaner fish. Tactile stimulation of the host is a key component of cleaning interactions (Losey and Margules 1974). Losey (1993) has experimentally shown that tactile stimulation, even from unrealistic stimuli, is sufficient to elicit a pose response in reef fishes, but this is the only known in situ observation of host posing behavior in response to a non-cleaner stimulus.

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References

- Keyes RS (1982) Sharks: an unusual example of cleaning symbiosis. *Copeia* 1:225–227
- Losey GS (1993) Knowledge of proximate causes aids our understanding of function and evolutionary history. *Mar Behav Physiol* 23:175–186

Losey GS, Margules L (1974) Cleaning symbiosis provides a positive reinforcer for fish. *Science* 184:179–180

Michael SW (1993) Reef sharks and rays of the world. *Sea Challengers*, Monterey

Wicksten MK (1998) Behaviour of cleaners and their client fishes at Bonaire, Netherlands Antilles. *J Nat Hist* 32:13–30

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