

Sharks as cleaners for reef fish

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Fig. 1 A rainbow runner (*Elagatis bipinnulata*) rubbing its flank along the skin of a grey reef shark (*Carcharhinus amblyrhynchos*) at Kingman reef. Note the direction of the rainbow runner's movements, moving towards the anterior section of the shark

Although the function of sharks as hosts to various species of cleaners is well documented (Keyes 1982), there have been no previous documented observations of sharks being used as cleaners by smaller reef fish. At Midway atoll (N 29.3, W 177.9), northwestern Hawaiian Islands, a 60 cm bluefin trevally (*Caranax melampygus*) was seen approaching the caudal fin of a 130–150 cm Galapagos shark (*Carcharhinus galapagensis*). The trevally nudged the end of the caudal fin causing the shark to gently accelerate and expose its right flank. The trevally then accelerated towards the posterior section of the shark's right flank, rubbing its left side against the shark's body moving in a tail to head direction. The trevally circled and repeated this behavior three times before both shark and trevally moved out of visual range. At Kingman reef (N 6.23, W 162.18), Line Islands, four rainbow runners (*Elagatis bipinnulata*) were observed swimming in formation towards the rear of a 140 cm grey reef shark (*Carcharhinus amblyrhynchos*). The leading

rainbow runner accelerated towards the shark and rolled over exposing its ventral surface. The rainbow runner then rubbed its back and flank along the shark's flank in a tail to head direction (Fig. 1). The shark responded by turning towards the remaining rainbow runners and accelerating, causing the fish to disperse.

Shark skin is covered with placoid scales which give it an abrasive quality when rubbed in a tail to head direction. We suggest that the shark provides an abrasive surface against which fishes remove dermal parasites, necrotic tissue and other irritations. To the best of our knowledge this is the first example of a commensal cleaner symbiosis, where the cleaner is not the benefactor.

Reference

Keyes RS (1982) Sharks: an unusual example of cleaning symbiosis. *Copeia* 1:225–227

Y. P. Papastamatiou (✉)

Department of Zoology, Hawaii Institute of Marine Biology, University of Hawaii at Manoa, 46-007 Lilipuna rd, Kaneohe, HI 96744, USA
e-mail: yannis@hawaii.edu

C. G. Meyer

Hawaii Institute of Marine Biology, University of Hawaii at Manoa, 46-007 Lilipuna rd, Kaneohe, HI 96744, USA

J. E. Maragos

Pacific/Remote Islands National Wildlife Refuge Complex, U.S. Fish and Wildlife Service, Honolulu, HI 96850, USA

Reef sites

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