

Chapter 8



Separated by the tide
but united by resources:
shared intertidal resource
use by avian and marine
mesopredators

**This chapter has been removed
from this version and will be
published online at a later stage!**

Guido Leurs, *et al.*

Manuscript

BOX E: WHO EATS THE RAYS?

Within the Bijagós Archipelago, communities generally believe that the decline of hammerhead sharks in their waters has caused an increase in smaller benthic stingrays. This apparent mesopredator release has also been hypothesized, discussed and disputed in scientific studies (e.g., Myers *et al.* 2007, Grubbs *et al.* 2016). I further discuss the potential of mesopredator release of rays and cascading effects in **Chapter 11**. However, for a mesopredator release to occur, the mesopredator needs to make up a considerable proportion of the diet of the removed predator (Grubbs *et al.* 2016). Based on our studies in the Banc d'Arguin and the Bijagós Archipelago and previous research (e.g., based on Flowers *et al.* 2021), I show that various marine predators may consume rays. Cownose rays, eagle rays, stingrays and round rays have mostly been documented in the diet of hammerhead sharks and other shark species. However, marine mammals and birds also predate on these species (**Figure E1**). Our research shows that in intertidal areas, large guitarfish (Glaucostegidae) and butterfly rays may predate on stingrays (**Chapter 8**, Last *et al.* 2016, Dean *et al.* 2017). We show that large teleost species, like cobias (*Rachycentron canadum*), predate on stingrays in the Bijagós Archipelago. Although these ray species have primarily been documented in the diet of large sharks, their contribution is often less than 20% of the overall diet (**Figure E1**).

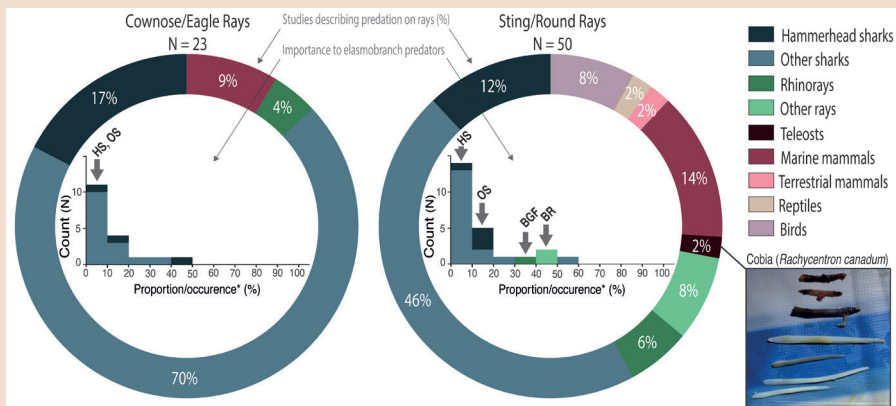


Figure E1 The proportion of documented cases of predation on cownose/eagle rays (left circle) and sting/round rays (right circle) by different predator groups. The inner bar graphs show the number of studies describing the occurrence or proportion of rays in the diet of different elasmobranch groups. Arrows indicate the estimated contribution of the two ray species groups to the diet of hammerhead sharks (HS), other sharks (OS), blackchin guitarfish (BGF; *Glaucostegus cemiculus*) and spiny butterfly ray (BR; *Gymnura altavela*; **Chapter 8**). The photo (right) shows our finding of stingray barbs embedded in the jaw and stomach wall of Cobias (*Rachycentron canadum*) in the Bijagós Archipelago. *Combined study outcomes for stable isotope analysis, frequencies of occurrence in stomach contents or relative important indices.