

Killer whale *Orcinus orca* predation on sunfish *Mola mola*

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The stomach contents from a killer whale stranded in north-west Ireland were examined. Siphonostomatoid copepods Cecrops latreilli and bones consistent in shape and size with those from the ocean sunfish were found. While observations of free-ranging killer whales preying on sunfish exist from the Gulf of Guinea and the South Pacific, this is the first record for the North Atlantic and the first from stomach content analysis.

Keywords: killer whale, ocean sunfish, predation, ectoparasite

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Knowledge about the diet of killer whales, *Orcinus orca* (Linnaeus, 1758), in the waters surrounding western Europe is scant (O'Brien *et al.*, 2009) with the exception of Norwegian and Scottish waters where killer whale occurrence is strongly linked with that of Atlantic herring (*Clupea harengus*) (Similä *et al.*, 1996) and harbour seals (*Phoca vitulina*) (Bolt *et al.*, 2009; Foote *et al.*, 2010). In Britain and Ireland limited research from observational studies (Wilson & Pitcher, 1979; Ryan & Wilson, 2003) and from diet content analysis (Santos *et al.*, 1995; McHugh *et al.*, 2007) indicate that killer whales there feed on Atlantic salmon (*Salmo salar*) and oceanic cephalopods. In contrast, stable isotope analysis of a Scottish specimen suggested a diet of marine mammals (McHugh *et al.*, 2007). In one study (Foote *et al.*, 2009), morphological, genetic and stable isotope evidence indicated that two ecotypes exist sympatrically in the north-east Atlantic: generalist and specialist, where stable isotope ratios indicate ecotype (Bolt *et al.*, 2009; Foote *et al.*, 2009). Ecotypes were reported as generalist (type 1) and specialist (type 2), the latter exhibiting a narrower niche-width and higher trophic status (Foote *et al.*, 2009). The diet of generalists is believed to include herring, Atlantic mackerel (*Scomber scombrus*) and harbour seals (Foote *et al.*, 2010) while that of specialists may comprise other cetaceans such as baleen whales (Foote *et al.*, 2009).

A stranded adult female killer whale measuring 5.12 m in length found at Doohoma, County Mayo, Ireland was examined on 4 October 2010. Significant apical tooth-wear was noted, suggesting type 1 ecotype (Foote *et al.*, 2009). Part of the mitochondrial DNA control region was sequenced (see (Foote *et al.*, 2009) for methods), indicating that the specimen was an Atl_1_33 haplotype, the most common haplotype found between Iceland and Norway

(Foote *et al.*, 2009, 2011). The specimen was found to have been pregnant with a near-term foetus. The stomach contents were removed for examination. Siphonostomatoid copepods were found in the stomachs and identified as *Cecrops latreilli* (Leach, 1816), an ectoparasite on the gills and skin of sunfish, (*Mola mola* (Linnaeus, 1758) and *M. lanceolata* (Grabda, 1973)). *Cecrops latreilli* has a cosmopolitan distribution, following that of its host and has previously been recorded on the gill filaments of sunfish in Irish waters (Cooper *et al.*, 1982). Partially digested bony structures consistent in shape and size with the modified toothless premaxilla and dentary of sunfish were also found in the stomachs. It was not possible to calculate the body size of the prey by allometric regression as the spongiform nature of sunfish bones means they are prone to shrinkage (Gregory & Raven, 1934). While *C. latreilli* has been questionably recorded from Atlantic bluefin tuna (*Thunnus thynnus*) (Brian, 1912; Grabda, 1973), the presence of bony structures from sunfish in the whale's stomach confirms that sunfish was the copepod host.

Killer whale predation on sunfish has previously been recorded from observational studies in the South Pacific and Gulf of Guinea (Gladstone, 1988; Weir *et al.*, 2006) and in captivity (Caldwell & Brown, 1964). To our knowledge, this is the first recorded incidence of such an interaction in the North Atlantic. It is possible that erratic deep diving (to almost 500 m) observed in a satellite telemetry study of sunfish was an avoidance response to predators such as killer whales (Sims *et al.*, 2009). Whether sunfish represent a significant proportion of the diet of killer whales in the North Atlantic is unknown. There are no results from stable isotope ratios of sunfish tissues in the literature (Pope *et al.*, 2010); however, future studies on both killer whales and sunfish using this and other analytical chemical techniques may shed light on the importance of sunfish in the diet of killer whales. While this is a single observation, it indicates that killer whales do predate on *Mola mola* which the authors feel merits further investigation.

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