

Ingestion of Plastic and Unusual Prey by a Juvenile Harbour Porpoise

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Considerable quantities of plastic debris are found throughout the world's oceans (e.g., Dufault and Whitehead, 1994), and may impact a diversity of species, including marine turtles, birds and mammals (Laist, 1997). Since many species of whales and dolphins live in waters far from shore, and may sink upon death, opportunities to record instances of ingestion of marine debris by cetaceans are infrequent. Despite this, there are several cases where ingestion of plastic or other marine debris has been documented for cetaceans, with published reports existing for 21 species of odontocetes (Laist, 1997). We know of an additional five species of odontocetes for which marine debris ingestion has been documented: the killer whale (*Orcinus orca*; K. Evans, pers. comm.), northern bottlenose whale (*Hyperoodon ampullatus*; R. Michaud, pers. comm.), finless porpoise (*Neophocoena phocoenoides*; C. Parsons, pers. comm.), white-beaked dolphin (*Lagenorhynchus albirostris*; R. Kastelein, pers. comm.), and pantropical spotted dolphin (*Stenella attenuata*; K. Robertson, pers. comm.). For most species of odontocetes, only one or a few records have been reported. Here we document the third reported case of plastic ingestion by a harbour porpoise (*Phocoena phocoena*), and discuss factors that might have contributed to its ingestion.

On 11 September 1997 a harbour porpoise was found dead on a beach near Pictou, Nova Scotia, Canada (45° 41'N, 62° 42'W), bordering Northumberland Strait in the Gulf of Saint Lawrence. The animal was buried on the beach where it was found, and then uncovered on 14 September and transported to Halifax, Nova Scotia, where it was frozen intact for later post-mortem. While the animal had been dead for at least four days prior to freezing, because it had been buried, relatively little external damage from gulls or other scavengers was apparent. Upon external examination, it was noted that the porpoise, a 95.2 cm long male, was visibly emaciated, with a distinct concavity of the dorsal surface on both sides of the body, indicating atrophy of the epaxial muscles. The leading edge of the flippers, flukes, and dorsal fin, as well as the area around the snout, were all examined for net marking, but showed no signs of incidental entanglement in fishing gear. All thoracic and abdominal organ systems were examined, and no obvious gross pathology was noted. The stomach and intestines were

empty, other than small amounts of bile stained liquid throughout the intestine. Upon examination of the esophagus, a balled up piece of black plastic (measuring when stretched out about 5 by 7 cm, weighing 0.36 grams) was found adjacent to the junction with the stomach. Immediately cranial to this plastic was a mass of fish bones, partially digested fish, and three intact fish (a total of 2.7 grams), all occluding the esophagus. The lining of esophagus immediately adjacent to the mass of fish peeled off easily, while the lining further cranial, as well as the stomach lining, remained firmly attached. However, histological examination of the esophageal lining showed no obvious necrosis (P.-Y. Daoust, pers. comm.). The fish remains recovered were identified as three-spined stickleback (*Gasterosteus aculeatus*) (W.A. Walker, pers. comm.). A total of 18 individuals were represented, ranging in size from 22-28 mm standard length, and all had been recently ingested.

This appears to be the first record of three-spined stickleback recovered from a harbour porpoise (see for example Fontaine *et al.*, 1994; Gannon *et al.*, 1998; Rae, 1965, 1973; Recchia and Read, 1989; Smith and Gaskin, 1974; Smith and Read, 1992), and possibly the first record of predation on this fish by any species of cetacean, though they are regularly consumed by otters, *Lutra lutra* (Breathnach and Fairley, 1993). As noted, there are two previous records of plastic ingestion for this species (Kastelein and Lavaleije, 1992; Walker and Coe, 1990), and several additional unpublished records of plastic ingestion exist from the Netherlands (R. Kastelein, pers. comm.). In our case, the ingested plastic probably blocked the esophagus, although for how long is not clear, though it is unlikely to have been for very long, given there was no necrosis associated with the blockage. We do not know whether this plastic caused the death of the individual, but its emaciated state and the presence of a previously undocumented prey species suggests that the individual may have been investigating inappropriate prey items. Based on its size and timing of the stranding, it is likely that this individual was only a few months of age, and likely had not yet been weaned (J. Barnett, pers. comm.), thus pre-weaning separation from its mother may have led to the ingestion of inappropriate items.

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