FIRST EVIDENCE OF INGESTION OF PLASTIC DEBRIS BY SEABIRDS AT SUB-ANTARCTIC HEARD ISLAND

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The presence of ingested anthropogenic marine debris in seabirds is of growing concern, especially in areas of the earth remote from point sources. It is increasing despite control measures, and impacts to wildlife are poorly understood (Ryan 1993). We report here the first evidence of ingestion of plastic debris by seabirds at sub-Antarctic Heard Island (53°S, 73°E) in the southern Indian Ocean during the Australian National Antarctic Research Expeditions (ANARE) visit in 2000/01.

Seabird carcasses were collected between October 2000 and January 2001 around Atlas Cove, an unglaciated region on the northwestern coast of Heard Island. To assess accurately any impactions, lacerations or ulcerations in the digestive systems attributed to ingestion of plastic debris, birds were collected for necropsy only if found intact and not decomposed (Auman *et al.* 1998). Totals of 10 South Georgian Diving Petrels *Pelecanoides georgicus,* four Subantarctic Skuas *Catharacta antarctica,* one Southern Giant Petrel *Macronectes giganteus,* two Antarctic Prions *Pachyptila desolata* and one unidentified diving petrel *Pelecanoides* sp. were collected.

Of the 18 carcasses dissected, we found only two birds, both Antarctic Prions, with plastic particles inside their digestive systems. One prion had a single orange-pink plastic particle (8.1 × 5.4 × 0.4 mm, 9.8 mg) in the proventriculus, which also contained two squid beaks and the remains of unidentified crustaceans. The bird was of indeterminate sex with an early-stage brood patch and no visceral or subcutaneous adipose tissue. A second adult male Antarctic Prion contained one light blue plastic particle in the gizzard (6.0 × 4.4 × 0.6 mm, 9.0 mg). The diameter of this particle was larger than the pyloric sphincter against which it was lodged. This may have created an obstruction to food; however, the bird had an empty proventriculus and high amounts of visceral and subcutaneous adipose tissue.

Because Antarctic Prions are surface seizers it is not surprising that we found plastic debris in this species and not in the others that employ different feeding methods (Marchant & Higgins 1990). Ryan (1987) found that 36% of 77 Antarctic Prions found dead on South African beaches contained plastics, whereas 73% of 11 birds collected at sea of South Africa contained plastics. Mean number of particles was 2.7 (maximum: 22) and mean mass was 50.2 mg (maximum: 615 mg) for 88 birds.

The quantities found in the two Antarctic Prions at Heard Island are not likely to cause physiologic stresses seen in other birds, such as starvation (Dickerman & Goelet 1987), suppressed appetite and reduced growth (Ryan 1988a), lower fledging masses (Sievert & Sileo 1993), decreased fat deposition (Conners & Smith 1982), increased PCB and other organochlorine assimilation (Ryan *et al.* 1988) or satiation and obstruction in the gut (Auman *et al.* 1998).

To assess potential indirect sources of marine debris ingestion, regurgitated Subantarctic Skua casts (pellets) were collected from several roosting localities around Atlas Cove. Of 396 casts dissected, two (0.5%) contained small plastic particles (16.7 × 3.8 × 1.0 mm, 178.83 mg; 5.7 × 4.1 × 2.7 mm, 104.38 mg). One piece of plastic material was found next to an old scattered cast and not collected, but we believe that it was once part of that cast. Ryan & Fraser (1987) reported a much higher incidence (22%) of casts

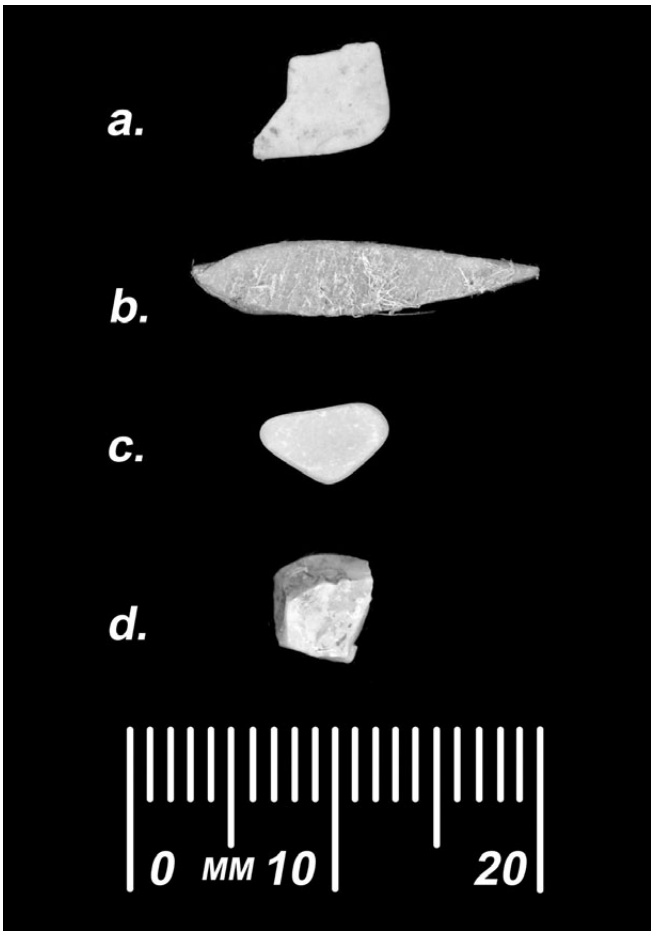

Fig. 1. Plastic debris ingested by seabirds at Heard Island, 2001/01.

containing plastic debris in Subantarctic Skuas at Inaccessible Island, South Atlantic. Because skuas have the ability to eliminate indigestible remains such as feathers, bones and eggshells, ingestion of small amounts of plastic debris is not likely to pose a problem to individuals of this species.

Although the incidence of anthropogenic materials in the digestive systems and casts of seabirds at the Heard Island World Heritage Site appears to be at a low level when compared with other less remote localities (Ryan 1987; but note that breeding birds may carry lower plastic loads than non-breeding birds, Ryan 1988b), their presence remains troubling. The persistence of marine debris at localities far removed from point sources should not be underestimated, and the long-term impacts merit an increased level of attention on an international scale.

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