

UNUSUAL DEATHS OF SUBANTARCTIC SKUAS *CATHARACTA ANTARCTICA* AT HOPE BAY, ANTARCTICA

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Received 1 September 1994, accepted 9 October 1995

The Subantarctic Skua *Catharacta antarctica* has a circum-polar sub-Antarctic distribution and extends south along the islands of the Scotia Arc and the Antarctic Peninsula to about 65°S (Hemmings 1984). Subantarctic Skuas are well known for their opportunistic feeding habits. They have been recorded as predators, scavengers, and kleptoparasites of a wide variety of organisms (Pietz 1987). In addition, they feed on garbage from the bases established by man (Peter *et al.* 1990).

Esperanza Station is located at Hope/Esperanza Bay (63°24'S, 56°59'W) on the northwestern side of the Antarctic Peninsula. In this area there are six breeding pairs of Subantarctic Skuas and one pair of South Polar Skuas *C. maccormicki* (N.R. Coria & D. Montalti unpubl. data) and a large Adélie Penguin *Pygoscelis adeliae* colony (123 859 pairs, Myrcha *et al.* 1987). The penguin colony provides a great quantity of food for skuas, and is the main reason Subantarctic Skuas congregate here from other areas. They are part of resident clubs of nonbreeders (N.R. Coria & D. Montalti unpubl. data).

During 28–29 January 1990, 38 Subantarctic Skuas were found dead in a small area in the neighbourhood of Boeckella Lake near Esperanza Station. A further 11 birds were found in a very sick condition. No other bird species were found dead on the area. It was evident that all the dead birds came from elsewhere because no breeding birds were affected. R. Fontana (pers. comm.) found 12 dead Subantarctic Skuas near Boeckella Lake in January 1981. The cause of death on discovery was unknown, the carcasses showing no signs of damage. On 29 January we saw 11 very weak skuas, but in the following days these birds were not seen in the area. Ten skuas were collected, frozen, and later analysed in the Instituto Antártico Argentino in April 1990. Liver, brain, muscle, kidney, feathers, beak, claws and stomach contents were assayed for cadmium, lead,

copper, zinc and mercury, as well as for organochloride pesticides. In addition, water from Boeckella Lake was analysed. Analyses were carried out on three four-litre samples for hydrocarbons, pesticides and heavy metals (Greenberg *et al.* 1992). Feathers, beaks, and claws were also analysed in search of chronic contamination but with the techniques above mentioned no contamination could be detected.

Cadmium, lead, copper and zinc concentrations were determined through Atomic Absorption Spectrophotometry with an air-acetylene flame (Marcovecchio *et al.* 1988). For total mercury determination, flameless atomic absorption spectrophotometry was used, after wet digestion (Moreno *et al.* 1984). Chlorinated hydrocarbons were determined using gas-liquid chromatographic analysis (FAO 1975).

Parica & D'ascanio (1993) determined levels of turbidity, pH, dissolved solids, and analysis of calcium carbonates, chlorides, sulphates, ammonia, nitrites and nitrates from Boeckella Lake water. The levels found were not considered harmful to Subantarctic Skuas. Because the dead birds did not possess any subcutaneous adipose tissue, it was impossible to look for organochloride pesticides resulting from bioaccumulation. Heavy metals and organochloride pesticide levels were very low and lead and mercury were not detected by the method used (Table 1). Under macroscopic examination the birds did not show any important pathological signs. All the birds were adults, their mean body mass was 1750 g (S.D. \pm 325 g, range 1580–2100 g, n=38). These data for dead Subantarctic Skuas are similar to those of body mass for live birds at Potter Peninsula, South Shetland Islands (1822 \pm 211 g, range 1150–2150 g, n=136, D. Montalti unpubl. data).

The stomachs contained very little food: mainly penguin flesh,

TABLE 1

HEAVY METALS (MEAN \pm STANDARD DEVIATION, μ G/G WET MASS) IN MUSCLE, LIVER, KIDNEY AND STOMACH CONTENTS OF SUBANTARCTIC SKUAS *CATHARACTA ANTARCTICA* (N=10) AT HOPE BAY, ANTARCTICA

| | Cadmium | Copper | Zinc | Lead | Mercury |
|------------------|--------------------|--------------------|---------------------|-------|---------|
| Muscle | 0.62 \pm 0.30 | 0.49 \pm 0.22 | 15.1 \pm 2.63 | <0.05 | <0.033 |
| Liver | 1.67 \pm 2.28 | 2.4 \pm 0.48 | 44.29 \pm 6.13 | <0.05 | <0.033 |
| Kidney | 3.01 \pm 0.28 | 2.71 \pm 0.42 | 39.2 \pm 1.85 | <0.05 | <0.033 |
| Stomach contents | 0.22 \pm 0.15 | 3.34 \pm 0.51 | 15.4 \pm 2.88 | <0.05 | <0.033 |

and small stones. Endoparasites, which are common for this species (Hoberg 1983), were found in three skuas. The absence of pathological signs and heavy parasite loads suggest that the ingestion of a toxic substance may have been the cause of death. The main hut of Base D (c. 500 m southeast of Esperanza Station) was destroyed by fire on 8 November 1948 (Hattersley-Smith 1991). Toxic materials such as batteries, generators, coal sacks and nautical nails which still remained in the destroyed building could have been a source of toxic chemicals. However, other scavenging birds occurring in the locality, such as Kelp Gulls *Larus dominicanus* and Greater or Pale-faced Sheathbills *Chionis alba*, were not found dead.

Parmelee *et al.* (1979) reported 22 dead Subantarctic Skuas near Palmer Station, Anvers Island (64°46'S, 64°03'W) in 1979; four of these birds were analysed and found to have died from avian cholera *Pasteurella multocida*. Unfortunately, although samples of some organs were collected at Hope Bay, no assay for avian cholera were undertaken at the time. Howie *et al.* (1968) recorded a great number of dead Greater Sheathbills in the vicinity of Signy Base (60°43'S, 45°35'W), South Orkney Islands. They suggested that one of the possible causes of death of these birds was acute stress due to unusually low temperatures. We recorded no unusual weather around the time of the skua deaths at Hope Bay. The possibility of the dead skuas we found having died of a disease such as avian cholera, rather than by poisoning, cannot be discounted. Future observations of unusual death of Antarctic seabirds should include analyses for diseases as well as for heavy metals and pesticides.

ACKNOWLEDGEMENTS

We are grateful to the Instituto Antártico Argentino for providing logistic support. S.R. Ialenti provided unpublished data.

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