

## Short Note

# Killer whale harassment of Adélie penguins at Ross Island

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On innumerable occasions, Adélie (*Pygoscelis adeliae*) and emperor penguins (*Aptenodytes forsteri*) have been observed in close proximity to killer whales (*Orcinus orca*), with no whale-penguin interactions reported. On the other hand, killer whales reportedly harass and eat seabirds on occasion (Walker 1968: p. 1122, Stacey *et al.* 1990, Williams *et al.* 1990). Killer whales are known to prey on young king penguins (*A. patagonica*) as they are fledging (Guinet 1992, Guinet & Bouvier 1995) and occasionally take emperor penguins (Mikhalev *et al.* 1981). Thomas *et al.* (1981) report killer whales chasing Adélies. Here we report the only observations of Adélie-killer whale interactions observed in nine field seasons on Ross Island.

While studying the ecology of Adélie penguins we conducted watches to quantify the predation of penguins by leopard seals (*Hydrurga leptonyx*) at Cape Crozier, Ross Island (77°30'S, 168°E), 1996–2004 (Ainley *et al.* 2005). We observed daily, 15 December–20 January, for periods of 1–5 hr, sitting ~200 m from the ocean and 115 m high with an unobstructed view of most of the beach and ice-edges adjacent to the colony (~130 000 breeding pairs of Adélie and up to 1200 pairs of emperor penguins), one of the world's largest Adélie colonies (Woehler 1993). We used 10 x 40/42 binoculars to aid in observations. Killer and minke whales (*Balaenoptera bonarensis*) were frequently present, and their numbers and activities were recorded.

Usually, we saw no interactions between the penguins and killer whales. On 17 December 1999 GB observed ~25 killer whales about 500 m from the penguin colony. DGA observed from about 1 km farther away. The group consisted of ~five adult male (6–7 m long, with large dorsal fins; Walker 1968), 15 female-type (4–5 m long with small dorsal fins), and at least six young (3–4 m long with small dorsal fins). We believe these were type 'C' whales (Pitman & Ensor 2003). Unfortunately, the video footage obtained at the time is not adequate to confirm this. Thousands of Adélie penguins were in the water nearby and hundreds of emperor penguin chicks were at the ice edge, with some in the water. The killer whales were diving under the Ross Ice Shelf edge, possibly foraging on fish. Several frequenting a crack in the fast ice several hundred metres from the open water behaved similarly. Ten or more Weddell seals (*Leptonychotes weddelli*) were hauled out near this crack, and two leopard seals were hauled out near the fast ice edge. A large number of Adélies appeared to be foraging in dense groups near or under the fast ice, but mostly in an area

separated from the killer whales by about 200 m of open water adjacent to fast ice.

After an hour, GB noticed splashes and boils in the water away from the main whale group. Two female-type whales seemed to be chasing Adélie penguins. The whales would dive for a minute or so and then a group of penguins would appear at the surface in the vicinity, porpoising in all directions (the "flash expansion" exhibited by schools or flocks pursued by a predator: Müller-Schwarze & Müller-Schwarze 1975, Hamner & Hamner 2000). Soon after, the whales surfaced, causing pressure waves to boil around the penguins. Mostly the penguins immediately jumped onto the fast ice edge, but on two occasions whales came out of the water, then crashed down in the midst of the penguin group. Penguins dispersed quickly and were able to avoid the whales. Similar activities continued for ~15 min, after which the whales re-joined the main group.

About 15 min later the same sorts of pressure waves were observed, but further from the ice edge. One female-type whale chased a single Adélie penguin, which porpoised left and right just in front. The whale seemed to herd the penguin back to the group, across ~500 m of open water. The whale mostly stayed just under the surface and swam rapidly left or right of the penguin's course. Upon approaching the ice shelf (which, at 12 m, was too high for a penguin to leap on), a group of killer whales, composed of six young and two female-types (no adult males), chased the penguin in circles, apparently using the ice shelf as a barrier to assist with containing the penguin. The whales formed a ring in which they tried to keep the penguin centred. This same series of events was repeated with at least three different penguins over the course of ~1 hr. GB filmed some of the activity, including one of the "herding" events and ensuing circle-chasing. After the killer whales moved on, skuas picked at a whole dead Adélie penguin floating at the surface nearby. We believe this penguin was a casualty of the whale encounter, since it is the only time we had seen a whole dead Adélie floating in this manner. No interactions were observed during several hours of watching next day, nor were any interactions observed during the subsequent field seasons, until 3 January 2005.

In this most recent observation, GB saw three apparently young (smaller than adult females, but larger than calves) killer whales chasing penguins which had been bathing near the fast ice edge (see description of penguin bathing in Ainley 1974, including attributes of predator avoidance),

~200 m from shore. The interaction lasted ~2 min, and no penguins were captured or isolated by the whales. The whales closely pursued several penguins, but these penguins briefly (and presumably inadvertently) “surfed” the pressure waves caused by the whales, thereby staying about 1 m from the whales, and then darted off to one side or the other, with no attempt to change course on the part of the whales. The whales subsequently swam rapidly from the fast ice edge, apparently chasing one another, occasionally porpoising, and not bothering thousands more penguins in the water. They soon joined ~20 type ‘C’ killer whales nearby, and swam off with them. This group included at least one adult male, and several adult females swimming with calves.

We believe that killer whales generally do not eat Adélie penguins based on the lack of published observations and our own extended observations, with thousands of penguins in “jeopardy” among up to three dozen whales. Probably Adélies are not worth the effort, being extremely agile swimmers and only about 4 kg of bone, feather, and penguin meat, especially compared with larger (and available) emperor penguins, Weddell and leopard seals, and Antarctic toothfish (*Dissostichus mawsoni*). However, if killer whales wanted to eat Adélie penguins, they do have ample opportunities at Cape Crozier and other colonies in the Ross Sea. Members of our project conducted leopard seal watches at Cape Royds (near the McMurdo Sound fast-ice edge and channel well known for large numbers of killer whales; Thomas *et al.* 1981, Pitman 2004) and at Cape Bird, ~35 km to the north. In these vicinities, groups of up to thousands of penguins regularly leave and return to the fast ice edge or beach. Along the McMurdo Sound ice edge, we have witnessed type ‘B’ killer whales consuming Weddell seals and passing up chances to dislodge Adélies from ice floes after spy-hopping along their edges, presumably searching for more seals.

The first observation reported here (17 December 1999) may be an instance of adult female killer whales offering instruction to young via play or practice behaviour (e.g. Safina 1997: p. 38). Interestingly, Baird & Dill (1995) noted no correlation between age composition of whale groups and prey handling time for extensive observations near Vancouver Island, British Columbia. In their observations, social-play was frequently observed in the context of feeding (mostly on pinnipeds), and was often associated with prolonged prey-handling. They concluded that the behaviour did not necessarily represent training opportunities for younger whales. Stacey *et al.* (1990) reported several instances of killer whales harassing seabirds of different species (also near Vancouver Island), mostly without consumption, and with notable similarity to behaviour reported here. However, in our first observation, the presence of so many young whales, and the apparent focus of the adults on delivering single penguins to the young without any attempt to actually consume the penguins lead us to speculate that training was precisely the

motivation. Such a scenario fits the definition of ‘training’ as reviewed by Baird (2000). While it seems killer whales rarely, if ever, eat Adélie penguins, penguins may offer a sort of “training simulator” for young learning to help provide food for the pod.

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