

CETACEANS AS PREDATORS OF JACKASS PENGUINS *SPHENISCUS DEMERSUS*: DEDUCTIONS
BASED ON BEHAVIOUR

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SUMMARY

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Opportunistic observations of the behaviour of Jackass Penguins *Spheniscus demersus* during interspecific encounters with cetaceans helped elucidate the role of cetaceans as possible predators. Of five species of cetaceans the penguins appeared to recognize Killer Whales *Orcinus orca* as predators, whereas Indian Ocean Bottlenosed Dolphins *Tursiops aduncus*, Common Dolphins *Delphinus delphis* and Southern Right Whales *Eubalaena australis* were ignored. Bryde's Whales *Balaenoptera edeni* are unlikely predators despite some evidence to the contrary.

INTRODUCTION

During a study of Jackass Penguins *Spheniscus demersus* we wished to establish what their likely predators were. The investigation was frustrated by the difficulty of obtaining observations and the scarcity of records in the literature, so we resorted to indirect methods. It proved possible by carefully examining injuries on Jackass Penguins to demonstrate that sharks, notably Great White Sharks *Carcharodon carcharias*, are predators (Randall *et al.* 1988). For cetaceans we reasoned that the behaviour of penguins in interspecific encounters with cetaceans could provide a useful insight into their role as predators. In this article we present the results of observations involving Jackass Penguins and five species of cetaceans.

STUDY AREA AND METHODS

With one exception all of the observations were

made at St Croix Island (33 48S, 25 46E) off the south east coast of South Africa. The exception was an observation at Mercury Island (25 43S, 14 50E) off the coast of Namibia.

For obvious reasons all observations were opportunistic and no attempt at quantification is made. Because all of the observations were made from the islands, interference from boats and humans can be discounted as a factor in the interactions.

RESULTS

Killer Whale *Orcinus orca*

An adult male Killer Whale was observed moving slowly past St Croix Island on 26 April 1980. When first observed it was about 40 m from the island and a group of about seven penguins was swimming nearby. Upon detecting the Killer Whale the

penguins immediately dived and then porpoised rapidly and synchronously in a tight formation towards the island. Porpoising is the fastest mode of locomotion used by swimming penguins and consists of shallow dives interspersed with short surface bursts to breathe when a penguin may propel itself clear of the water. The Killer Whale maintained its course and speed showing no apparent interest in the fleeing penguins. The penguins continued to porpoise away and on reaching the island scrambled up the rocks and ran inland for about eight metres.

Two Killer Whales, presumed to be an adult male and female, were observed on 12 and 13 April 1986 at Mercury Island which they patrolled continuously, usually closer than 20 m and sometimes within five metres of the shore (Williams *et al.* in press). Penguins intent on leaving the island moved away from their nests and progressed to the water's edge where they stopped and looked around. Upon seeing the Killer Whales they quickly turned and moved away from the water. Two penguins that entered the water stayed close to the rocks while checking below with frequent head-dipping. They appeared suddenly to detect the Killer Whales and immediately left the water and scrambled up the rocks.

Indian Ocean Bottlenosed Dolphin *Tursiops aduncus*

Indian Ocean Bottlenosed Dolphins commonly feed close to St Croix Island (Ross *et al.* 1987, pers. obs.). The only observable reaction from swimming penguins to the dolphins was an increased frequency of head-dipping. Penguins continued to leave the island to go feeding and bathing, even when dolphins were active in the immediate vicinity.

On one occasion only were Indian Ocean Bottlenosed Dolphins seen to produce an escape response from the penguins, when part of a school of dolphins pursuing fish swam rapidly in the direction of a group of penguins. The penguins

quickly porpoised away to the island, which was about 25 m away, and landed. They returned to the sea several minutes later while the dolphins were still present.

Common Dolphin *Delphinus delphis*

Common Dolphins have been observed at mixed species feeding associations with Jackass Penguins and other seabirds on several occasions. As in the case of Indian Ocean Bottlenosed Dolphins the penguins did not appear to respond to the Common Dolphins. Once part of a school of Common Dolphins was observed to swim towards and through a dispersed group of basking Jackass Penguins eliciting little response other than an increase in the amount of head-dipping.

Bryde's Whale *Balaenoptera edeni*

Bryde's Whales were rarely encountered at mixed species associations with Jackass Penguins and other seabirds feeding on small shoaling fish such as Pilchard *Sardinops ocellata* and Cape Anchovy *Engraulis capensis*. Bryde's Whales were undoubtedly attracted to these associations and were observed to approach and join feeding associations on several occasions. The seabirds continued to feed when the whales arrived and no escape response by penguins was noticed.

Southern Right Whale *Eubalaena australis*

Southern Right Whales occurred regularly in Algoa Bay in the late winter and spring months and at times two or more whales were observed within 40 m of the island. Penguins near the whales continued to bathe and swim, and the passage of penguins on and off the island appeared unaffected by the proximity of the clearly-visible whales.

DISCUSSION

The type of reaction shown by Jackass Penguins to Killer Whales contrasted with that shown towards the other four cetacean species. The behaviour of

Jackass Penguins in the presence of Killer Whales is typical of the way they behave when they are being hunted by Cape Fur Seals *Arctocephalus pusillus*. Cape Fur Seals are known to prey on Jackass Penguins (Rand 1959, Cooper 1974, Shaughnessy 1978, Broni 1984, pers. obs.). Porpoising, fleeing towards the island, leaving the water and scrambling up the rocks, as well as a reluctance to enter the water are all part of the antipredator behaviour of Jackass Penguins. The escape response of porpoising in Jackass Penguins can be induced by playing recordings of Killer Whale vocalizations (Frost *et al.* 1975), thus demonstrating that recognition of Killer Whales is so important that auditory cues alone are sufficient.

An alternative explanation for the behaviour of Jackass Penguins in the presence of Killer Whales is that it was a typical flight response to an unfamiliar and therefore potentially threatening object. Of the five species of cetacean discussed, Killer Whales would be the least familiar to Jackass Penguins because they are uncommon in South African seas (Ross 1984, Rice & Saayman 1987). It is also true that a similar flight reaction can be induced by a human in the water, but it has been our experience that the reaction is less extreme. Penguins on St Croix Island were reluctant to enter the water when we were snorkeling nearby. Penguins surprised by us in the water porpoised away but returned soon after and swam up, at times approaching to within two metres. We conclude that Jackass Penguins can discriminate between unfamiliar objects and predators, and that they do recognize Killer Whales as predators. There is no doubt that Killer Whales prey on Jackass Penguins (Rice & Saayman 1987, B.M. Dyer 1987 *in litt.*) and other species of penguins (Condy *et al.* 1978).

From limited observations at St Croix Island it appeared that Jackass Penguins did not recognize Bryde's Whales as predators. A different conclusion could be reached based on an isolated observation on the west coast of South Africa where a group of penguins porpoised away from an approaching Bryde's Whale (Broni 1984). The

observer could not establish if the whale was pursuing the penguins, and noted that on other occasions in the same area penguins fed together with Bryde's Whales and Cape Fur Seals in mixed species feeding associations. In terms of their diet Bryde's Whales appear to be unlikely predators of Jackass Penguins since their diet off the southern African coast comprises small shoaling fish and euphausiid crustaceans (Best 1967). Best (1967) did not record birds in any of 119 stomachs of Bryde's Whales he examined, although there is a record of 15 Jackass Penguins and Cape Gannets *Morus capensis* in the stomach of a Bryde's Whale (Olsen 1913). It is conceivable that a Bryde's Whale might simultaneously ingest small predators, such as penguins, and prey species when attacking a concentrated fish school in the frenzied melee of a mixed species feeding association.

Jackass Penguins did not appear to recognize any of the other three cetacean species as predators. Information on the diets of Indian Ocean Bottlenosed Dolphins and Common Dolphins (Ross 1984) and Southern Right Whales (Nishiwaki 1972) shows that none are likely predators of penguins. The escape response to a school of Indian Ocean Bottlenosed Dolphins observed hunting at St Croix Island was probably due to the inability of the penguins to identify the rapidly approaching dolphins. The relatively quick return of the penguins to the sea suggests that they did recognize them later.

The act of predation is often dramatic, particularly when large predators are involved, and for this reason records are often kept of the event. For example, seal predation on penguins is highly visible since a seal needs to shake its prey violently in order to break it into manageable portions (Rand 1959, pers. obs.). With cetaceans the capture, manipulation and swallowing of prey usually takes place underwater so that an observer can seldom establish the outcome of an attempt at predation (e.g. Condy *et al.* 1978). For such predators and their presumed prey, behavioural reactions during interspecific encounters can

provide a useful insight into relationships.

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REFERENCES

- BEST, P.B. 1967. Distribution and feeding habits of baleen whales off the Cape Province. *Investl rep. Div. Sea Fish. S. Afr.* 57: 1-44.
- BRONI, S.C. 1984. Penguins and purse-seiners: competition or co-existence? Unpubl. MSc. thesis, University of Cape Town, 124 pp.
- CONDY, P.R., VAN AARDE, R.J. & BESTER, M.N. 1978. The seasonal occurrence and behaviour of Killer Whales *Orcinus orca*, at Marion Island. *J. Zool., Lond.* 184: 449-464.
- COOPER, J. 1974. The predators of the Jackass Penguin *Spheniscus demersus*. *Bull. Brit. Orn. Club* 94: 21-24.
- FROST, P.G.H., SHAUGHNESSY, P.D., SEMMELINK, A., SKETCH, M. & SIEGFRIED, W.R. 1975. The response of Jackass Penguins to Killer Whale vocalisations. *S. Afr. J. Sci.* 71: 157-158.
- NISHIWAKI, M. 1972. General biology. In: Ridgway, S.H. (Ed.). *Mammals of the sea*. Springfield, I11, USA. C.C. Thomas, pp. 3-200.
- OLSEN, O. 1913. On the external characters and biology of Bryde's Whales (*Balaenoptera brydei*), a new rorqual from the coast of South Africa. *Proc. Zool. Soc., Lond.* 4: 1073-1090.
- RAND, R.W. 1959. The Cape Fur Seal (*Arctocephalus pusillus*). Distribution, abundance and feeding habits off the south western coast of the Cape Province. *Investl rep. Div. Sea Fish. S. Afr.* 34: 1-75.
- RANDALL, B.M., RANDALL, R.M. & COMPAGNO, L.J.V. 1988. Injuries to Jackass Penguins (*Spheniscus demersus*): evidence for shark involvement. *J. Zool., Lond.* 214: 589-599.
- RICE, F.H. & SAAYMAN, G.S. 1987. Distribution and behaviour of Killer Whales (*Orcinus orca*) off the coasts of southern Africa. *Invest. Cetacea* 20: 231-250.
- ROSS, G.J.B. 1984. The smaller cetaceans of the south east coast of southern Africa. *Ann. Cape Prov. Mus. (nat. Hist.)* 15: 173-410.
- ROSS, G.J.B., COCKCROFT, V.G. & BUTTERWORTH, D.S. 1987. Offshore distribution of bottlenosed dolphins in Natal coastal waters and Algoa Bay, eastern Cape. *S. Afr. J. Zool.* 22: 50-56.
- SHAUGHNESSY, P.D. 1978. Cape Fur Seals preying on seabirds. *Cormorant* 5: 31.
- WILLIAMS, A.J., DYER, B.M., RANDALL, R.M. & KOMEN, J. In press. Killer Whales *Orcinus orca* and seabirds: "play", predation, and association. *Mar. Orn.*