



Two dusky dolphins leaping off Namibia

WHY DO DOLPHINS JUMP?



Phoronts attached to dorsal fin



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Front view "Dr. Fridtjof Nansen"

Aft view "Dr. Fridtjof Nansen"

Abstract

A large group of about 400 dusky dolphins (*Lagenorhynchus obscurus*) was studied off northern Namibia in September 2002, using R/V "Dr. Fridtjof Nansen". Digital video recordings were used to study dolphin behaviour. Five dusky dolphins were accidentally caught during a pelagic trawl haul targeting Cape horse mackerel (*Trachurus trachurus capensis*). A total of 50 specimens of *Xenobalanus globicipitis* (Crustacea: Cirripedia), size range 10-50 mm were obtained, all firmly attached to all five dolphins at the trailing margins of the fluke and the dorsal fin and the lower base of the flippers. This phoront species has also been reported from many other toothed whales worldwide. Toothed whales are known to frequently jump out of the sea, often landing with a big splash. By comparing the presence and position of the cirripeds with the jumping behaviour of the dolphins, we believe there is a causal relationship between the cirripeds and why the dolphins jump. We recorded several different types of jumping/ surface behaviour: 1) Leap: arch-shaped jumping, landing head first, 2) Twist: jump while rotating body 180° left or right in the air, landing while hitting dorsal fin at the surface, 3) Lift: elevate whole, or frontal part of, body above the surface, landing while hitting flippers at the surface, 4) Somersault: 270° forward loop and twisting body 180°, landing while slapping fluke on impact, 5) Twisted loop: jump and lift fluke above head while rotating the body 90° in the air, slapping fluke on impact, and 6) Tail-slap: fast swimming while performing powerful, frequent tail-slaps at the surface. The results strongly suggest that dusky dolphins often jump in order to get rid of *X. globicipitis* attached to their skins, according to their presence and position. While there is no evidence to suggest that leaping is related to *X. globicipitis*, as no specimens were found in the head region, all latter five dolphin behaviour types can likely be explained by the presence and position of *X. globicipitis*. This is to our best knowledge the first time a causal link between marine mammal behaviour and "guest" phoronts has been identified. Since *X. globicipitis* on dolphins and other marine mammals is common globally, this phoront species may be of major importance for jumping/ surface behaviour in marine mammals.

Individual data on dusky dolphins accidentally caught in pelagic trawl.

Length (cm)	Weight (kg)	Sex	# Phoronts		
			Fluke	Flippers	Dorsal fin
166	52	Male	11	2	7
176	58	Male	2	1	2
185	75	Male	4	0	6
167	60	Female	3	0	2
162	48	Male	4	2	4

Methods

Analyses are based on digital video-recordings (Sony DCR-TRV50E) of dusky dolphin surface behaviour recorded in northern Namibia, 23 Sept. 2002 and biological examinations of five accidentally caught animals, including weight, length, sex, stomach content, parasites (Nematoda, internal) and cirripeds (*Xenobalanus globicipitis*, external). Numbers and positions of all *X. globicipitis* were noted for each animal.



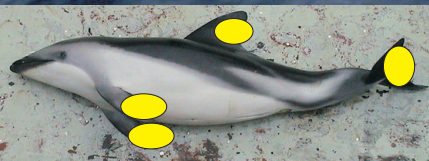
X. globicipitis firmly attached to the base of the fluke.



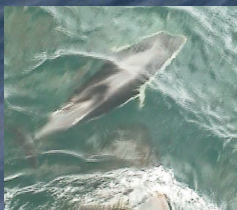
Horse mackerel (*Trachurus trachurus capensis*): dusky dolphin main prey off Namibia.



A dusky dolphin with *X. globicipitis* attached to the base of the fluke and outer edge of the left flipper.



The three specific sites where phoronts are attached to dusky dolphins: The flippers, the dorsal fin and the fluke.



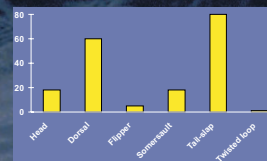
Dusky dolphins did not use the bow of the vessel to get rid of attached barnacles. The dolphins were only riding the bow of the vessel.

Different surface behaviour

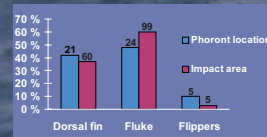
Take-off	Mid-air	Landing
Lbap (head)		
Twist (dorsal fin)		
Lift (flippers)		
Somersault (fluke)		
Tail-slap (fluke)		
Twisted loop (fluke)		

Results and Discussion

We ask a simple question and believe there may be a simple answer. In this study we demonstrate a link between the presence and positions of phoronts and how and why dolphins jump. Given that dolphins are irritated by the presence of *X. globicipitis* it makes sense that the dolphins jump in order to get rid of these "hitch-hikers".



Total number of each jumping / surface behaviour recorded on dusky dolphins.



Relative distribution of the phoronts on the dusky dolphins and corresponding impact areas during dolphin jumping and tail slapping ($r = 0.96$). Numbers of phoronts and observations are indicated.

How else could they do it? Since the phoronts are only attached to the dorsal fin, flippers and fluke it would presumably be difficult for the dolphins to scratch them off against hard substrate (rocks). For oceanic dolphins this would in any case not be an option. It would also be difficult to remove phoronts from conspecifics, due to their awkward location and firm attachment. In evolutionary terms it should be beneficial for the phoronts to locate themselves in protected areas and to attach as firmly as possible in order to minimize the risk of being "dismissed", while the dolphins should evolve increasingly effective means of removal. Generally, barnacles attached to dolphin species and great whales, are likely a main reason for their jumping and breaching behaviour worldwide.

Conclusion

Although jumping in some cases may be related to social, sexual display or play behaviour, both how and why dusky dolphins jump may largely be explained by cirriped "hitch-hikers".

