An interaction between Pacific white-sided dolphins and a neonatal harbor porpoise

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Inter-specific behavioral interactions in the order Cetacea are diverse and often complex, including predation (e.g. Jefferson *et al.* 1991), " harassment " (Shane 1995 ; Shelden *et al.* 1995 ; Palacios and Mate 1996 ; Weller *et al.* 1996), inter-specific mating (Herzing 1996 ; Baird *et al.* 1998), and aggression (Ross and Wilson 1996). Here I describe an interaction involving two Pacific white-sided dolphins *(Lagenorhynchus obliquidens)* and a neonatal harbor porpoise *(Phocoena phocoena)*, and discuss the " type " and potential functions of this interaction.

The interaction was observed on 25 July 1994 in eastern Haro Strait, in a small area (approximately 1 × 2 km) along the southwest side of San Juan Island (Washington state, USA - 48°28'N, 123°4'W). At 1209 hrs a report was received of two dolphins " playing " with a harbor porpoise. Observations commenced within several minutes, and were continuous for five hours. The entire interaction occurred within about 1 km of shore in water ranging from approximately 50 to 200 m in depth. Observations were made by the author and two other observers on board a 4.7-m outboard-powered boat, at distances ranging from less than 1 m to approximately 30 m (the vast majority of the time was spent between 5 and 10 m from the animals). Sea state was Beaufort 0 to 1 throughout. While detailed field notes are not available, 42 minutes of video footage and 19 color transparencies were taken during the first 2.5 hours of observation. Quantification of behavior (e.g. respiration rates) from video footage was not possible, as no time code was recorded on the film. A variety of features of the interaction could be seen however, and the video footage contains 117 surfacings of the harbor porpoise, and several hundred surfacings of the dolphins, as well as footage of all three animals under the surface.

Body lengths of both dolphins were estimated in the field to be about 1.5 to 1.6 m (based on body size relative to the boat, when the individuals were within 1 m of the boat) ; thus both individuals were thought to be juveniles (Perrin and Reilly 1984). Distinctive pigmentation patterns made it possible to distinguish between the two individuals throughout most of the encounter. There was one male and one female dolphin, based on the presence/absence of mammary slits visible when the individuals swam slowly, inverted, beneath the bow of the boat. The porpoise was a neonate, with fetal folds clearly visible along the side. Of 117 surfacings of the porpoise documented on video, 43 (36 %) could be described as a " chin slap ", with the animal's head coming clear of the water on the surfacing, further evidence of neonatal status (Amundin 1974). No other harbor porpoises or Pacific white-sided dolphins were seen that day.

Several things are evident from the video footage and from observations made in the field. During the entire observation period, the surfacing patterns of both the dol-

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phins and the porpoise had no consistent direction of movement, all three animals remained within a 1 × 2 km area, and none of the individuals made dives longer than about 1-2 minutes. There was no period when the porpoise was observed alone at the surface for more than a few seconds. When the observation boat was stationary in the water, the dolphins appeared to ignore the presence of the boat, while on many occasions when the boat was moving at greater than 1 to 2 knots, one or both dolphins would approach the boat to ride the bow wave (bowride) for brief periods.

In general, the activity level of the dolphins was quite high. A total of 32 leaps, with an animal coming partially or completely clear of the water and entering head first, were recorded on the video. Several breaches (where an animal landed on its side, back or belly) were also recorded. Both dolphins interacted with the porpoise throughout the entire period, though the male dolphin generally spent more time than the female dolphin in close proximity to the porpoise. The female dolphin would often bowride on nearby boats, separating from the porpoise and the male dolphin by as much as 200 m. On a number of occasions (estimated to be approximately 10 to 15) one of the dolphins was observed holding the porpoise's flipper in it's mouth and dragging the porpoise through the water, and on all occasions when the identity of the dolphin was determined (about four), this was the male. Both dolphins were observed to occasionally leap on top of the porpoise as it swam at or near the water's surface. On numerous occasions the porpoise appeared to be swimming away from the dolphins with one or both quickly catching up. On a number of occasions the porpoise swam close to our vessel; during these close approaches one or the other dolphin quickly swam between the porpoise and our boat, and turned away in such a fashion as to force the porpoise away from the boat. However, the porpoise also was observed swimming in echelon position (Lang 1966). This echelon swimming was observed throughout the observation period, including at least one bout (documented on the video) within the first 40 minutes of observation. As well, one or both dolphins occasionally rubbed against the porpoise or lifted it part way out of the water (Fig. 1).

Fig. 1. – Two juvenile Pacific white-sided dolphins with a neonatal harbor porpoise. One dolphin is shown lifting the porpoise part way out of the water. Photo by the author.

At approximately 1445 hrs, a decision was made to capture the porpoise, based on the low probability of survival of the animal in the wild, as well as the potentially threatened status of this species in the area (Cowan 1988 ; Baird and Guenther 1994, 1995). The porpoise was captured at approximately 1713 hrs. The two dolphins followed the capture boat for approximately 5 minutes after the porpoise was removed from the water. The porpoise was transported by boat to the closest port (Roche Harbor, San Juan Island), and then flown to the Point Defiance Zoo and Aquarium, where it survived for five days. The porpoise, a female, measured 83 cm and weighed 8.7 kg. Its age at capture was estimated at less than two days, based on the distinctness of the fetal folds and shape of the tail flukes (J. Foster, pers. comm.). Despite being dragged by its flipper, the porpoise only had superficial skin abrasions on its flippers when captured. Five wounds, consistent with bites, were found on the caudal peduncle. No other trauma was noted and cause of death was determined to be bacterial pneumonia.

While harbor porpoises regularly occur in Haro Strait, very few have been recorded in the deeper-water area of this interaction, despite extensive sighting effort (Baird and Guenther 1994). Based on the seasonal distribution of strandings of neonatal and pregnant female harbor porpoises in southern British Columbia (Baird and Guenther 1995), the interaction reported here occurred slightly prior to the main calving peak (August). Pacific white-sided dolphins are rare in Haro Strait (Calambokidis and Baird 1994) ; there have been only a few sightings in the last few years (Baird unpublished). Although Pacific white-sided dolphins previously have been reported associating with at least 10 different species of cetaceans (review *in* Stacey and Baird 1991), associations with harbor porpoises do not appear to have been previously published.

This observation is the first reported of an apparently non-predatory inter-specific interaction involving a lone cetacean neonate. Several possibilities regarding the proximate and ultimate causes of the interaction exist, including : 1) the demonstration of displaced (i.e., towards an unrelated individual) epimeletic behavior (Caldwell and Caldwell 1966) ; 2) aggression, motivated by competition, predation or for kleptoparasitism; or 3) " object-oriented " play (or nonmutual, interspecific play), with potential functional benefits associated with skill development or physical training (Fagen 1981).

The behavior of the dolphins bore some resemblance to the behavior of several species of odontocetes towards newborn calves, in the lifting of the neonate out of the water (e.g., Stacey and Baird 1997), and the observation of echelon swimming. Caldwell and Caldwell (1966) define epimeletic or care-giving behavior as either nurturant (towards young) or succorant (towards individuals in distress). Such behavior could evolve either among groups comprised of closely related individuals or among individuals with long-term bonds and the possibility of reciprocation. In theory demonstration of such behavior towards unrelated individuals could occur as a form of " practice ", for example juveniles practicing parenting skills. Succorant behavior has been documented previously in Pacific white-sided dolphins, with individuals remaining nearby and even supporting animals in distress, both in the wild and in captivity (Hubbs 1953 ; Brown and Norris 1956). Norris and Prescott (1961) previously documented inter-specific succorant behavior involving two female Pacific white-sided dolphins and a Dall's porpoise *(Phocoenoides dalli)* in captivity. In the current case, several aspects of the interaction suggest that epimeletic behavior is unlikely : 1) the apparently aggressive nature of some of the interactions (including the bite wounds) ; 2) the regular transfer of interest by the female dolphin from the neonate towards passing boats whenever they were creating waves large enough to bowride on ; and 3) frequent observations of the neonate appearing to try to swim away from the dolphins, with one or both dolphins quickly catching up.

In theory aggressive behavior could result if the two species compete for food, if the dolphins were attempting to kill and consume the porpoise, or if they were attempting to force it to regurgitate, and thus steal food from it. Kleptoparasitism has been suggested as a potential cause of one observation of dolphins harassing larger whales (Palacios and Mate 1996), though such an explanation seems unlikely in this case, given the young age and extremely small size of the porpoise (potentially only carrying a small volume of milk in it's stomach). The possibility of predation also seems extremely unlikely, given what is known about the diet of Pacific white-sided dolphins (cephalopods and small schooling fish, see review *in* Stacey and Baird 1991). In terms of competition, there is overlap in diet with harbor porpoises, but the two species differ drastically in habitat use (Stacey and Baird 1991 ; Baird and Guenther 1994 ; Calambokidis and Baird 1994 ; Gearin *et al.* 1994). Relatively little is known about the diets of either species in the area where this observation took place however, so it is not possible to conclude whether competition between these species may have motivated an aggressive interaction between them. Regardless, the wounds present on the porpoise were relatively minor (cf. Ross and Wilson 1996), and the dolphins certainly had the opportunity to inflict greater damage than was exhibited, so it seems unlikely that the interaction was primarily aggressive in nature. However, there is one prior case of possible Pacific white-sided dolphin aggression towards a harbor porpoise : an older porpoise washed ashore on the outer Washington coast with numerous tooth rakes consistent with those inflicted by Pacific white-sided dolphins (K.C. Balcomb, pers. comm.).

In many ways the observations appear similar to object-oriented play (or non-mutual, inter-specific play) behavior, with, in this case, the " object " being the harbor porpoise. The function(s) or beneficial effects of " play " in such cases are usually related to physical training or skill development, and this is certainly a possibility in this case. Numerous examples of similar behavior exist (Smith 1978 ; Fagen 1981), including several examples with cetaceans. These include killer whales *(Orcinus orca)* " playing " with and sometimes killing, but not eating, seabirds (Stacey *et al.* 1990), short-finned pilot whales *(Globicephala macrorhynchus)* carrying around dead sea lions (Shane 1994), and belugas *(Delphinapterus leucas)* carrying a variety of objects, including planks, a caribou skeleton, and a piece of net (Smith and Sleno 1986). Whether the observation reported here is just an example of a rare, aberrant case, or is actually an indication that such interactions occur between these two species more frequently, requires further observations in areas where they commonly overlap.

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Bibliography

AMUNDIN, M., 1974. – Functional analysis of the surfacing behaviour in the harbour porpoise, *Phocoena phocoena* (L.). *Z. Säugetierkunde*, 39 : 313-318.

BAIRD, R.W. and T.J. GUENTHER, 1994. – Status of porpoises in the British Columbia/Washington trans-boundary area : a Canadian perspective. *Puget Sound Notes*, 34 : 5-8.

BAIRD, R.W. and T.J. GUENTHER, 1995. – Account of harbor porpoise *(Phocoena phocoena)* strandings and bycatches along the coast of British Columbia. *Rep. Int. Whal. Comm. Spec. Iss.*, 16 : 159-168.

BAIRD, R.W., P.M. WILLIS, T.J. GUENTHER, P.J. WILSON and B.N. WHITE, 1998. – An intergeneric hybrid in the family Phocoenidae. *Can. J. Zool.*, 76 : in press.

BROWN, D.H. and K.S. NORRIS, 1956. – Observations of captive and wild cetaceans. *J. Mammalogy*, 37 : 311-326.

CALAMBOKIDIS, J. and R.W. BAIRD, 1994. – Status of marine mammals in the Strait of Georgia, Puget Sound and the Juan de Fuca Strait and potential human impacts. *Can. Tech. Rep. Fish. Aquat. Sci. 1948* : 282-300.

CALDWELL, M.C. and D.K. CALDWELL, 1966. – Epimeletic (care-giving) behavior in cetacea. Pp. 755-789, *in : Whales, dolphins and porpoises*. Ed. Norris, University of California Press, Berkeley.

COWAN, I.M., 1988. – The marine mammals of British Columbia, their status and distribution. Pp. 95-104, *in : The wildlife of northern British Columbia - past, present and future*. Ed. Fox. Spatsizi Association for Biological Research, Smithers, British Columbia.

FAGEN, R., 1981. – *Animal play behavior*. Oxford University Press, New York.

GEARIN, P.J., S.R. MELIN, R.L. DELONG, H. KAJIMURA and M.A. JOHNSON, 1994. – Harbor porpoise interactions with a chinook salmon set-net fishery in Washington state. *Rep. Int. Whal. Comm. Spec. Iss.*, 15 : 427-438.

HERZING, D.L., 1996. – Vocalizations and associated underwater behavior of free-ranging Atlantic spotted dolphins, *Stenella frontalis* and bottlenose dolphins, *Tursiops truncatus*. *Aquat. Mamm.*, 22 : 61-79.

HUBBS, C.L., 1953. – Dolphin protecting dead young. *J. Mammalogy*, 34 : 498.

JEFFERSON, T.A., P.J. STACEY and R.W. BAIRD, 1991. – A review of killer whale interactions with other marine mammals : predation to co-existence. *Mamm. Rev.*, 21 : 151-180.

LANG, T.G., 1966. – Hydrodynamic analysis of cetacean performance. Pp. 410-432, *in : Whales, dolphins, and porpoises*. Ed. Norris, University of California Press, Berkeley.

NORRIS, K.S. and J.H. PRESCOTT, 1961. – Observations on Pacific cetaceans of California and Mexican waters. *Univ. Calif. Pub. Zool.*, 63 : 291-402.

PALACIOS, D.M. and B.R. MATE, 1996. – Attack by false killer whales *(Pseudorca crassidens)* on sperm whales *(Physeter macrocephalus)* in the Galapagos Islands. *Marine Mammal Science*, 12 : 582-587.

PERRIN, W.F. and S.B. REILLY, 1984. – Reproductive parameters of dolphins and small whales of the family Delphinidae. *Rep. Int. Whal. Comm. Spec. Iss.*, 6 : 97-133.

ROSS, H.M. and B. WILSON, 1996. – Violent interactions between bottlenose dolphins and harbor porpoises. *Proc. Royal Soc. Lond. B.* 263 : 283-286.

SHANE, S.H., 1994. – Pilot whales carrying dead sea lions. *Mammalia*, 58 : 494-498.

SHANE, S.H., 1995. – Relationship between pilot whales and Risso's dolphins at Santa Catalina Island, California, USA. *Mar. Ecol. Progress Series*, 123 : 5-11.

SHELDEN, K.E.W., A. BALDRIDGE and D.E. WITHROW, 1995. – Observations of Risso's dolphins, *Grampus griseus* with gray whales, *Eschrichtius robustus. Marine Mammal Science*, 11 : 231-240.

SMITH, E.O. (ed.) 1978. – *Social play in primates*. Academic Press, New York.

SMITH, T. G. and G.A. SLENO, 1986. – Do white whales, *Delphinapterus leucas*, carry surrogates in response to early loss of their young ? *Can. J. Zool.*, 64 : 1581-1582.

STACEY, P.J. and R.W. BAIRD, 1991. – Status of the Pacific white-sided dolphin, *Lagenorhynchus obliquidens*, in Canada. *Can. Field-Nat.*, 105 : 219-232.

STACEY, P.J. and R.W. BAIRD, 1997. – Birth of a " resident " killer whale off Victoria, British Columbia, Canada. *Marine Mammal Science*, 13 : 504-508.

STACEY, P.J., R.W. BAIRD and A.B. HUBBARD-MORTON, 1990. – Transient killer whale *(Orcinus orca)* harrasment, predation, and " surplus killing " of marine birds in British Columbia. *Pacific Seabird Group Bull.*, 17(1) : 38.

WELLER, D.W., B. WURSIG, H. WHITEHEAD, J.C. NORRIS, S.K. LYNN, R.W. DAVIS, N. CLAUSS and P. BROWN, 1996. – Observations of an interaction between sperm whales and short-finned pilot whales in the Gulf of Mexico. *Marine Mammal Science*, 12 : 588594.

Extensive scarring observed on female or juvenile male sperm whales off the Galápagos Islands

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Scarring on sperm whales *(Physeter macrocephalus)*, predominately on mature males, has been previously noted (Best 1979 ; Kato 1984). This scarring has often been attributed to aggression between males (Caldwell *et al.* 1966 ; McCann 1974 ; Best 1979 ; Kato 1984), although the possibility of scars being caused by the hooks and suckers of squid has also been mentioned (Clarke *et al.* 1968 ; McCann 1974). Extensive scarring on female or juvenile male sperm whales has not previously been noted (Matthews 1938 ; Best 1979 ; H. Whitehead, personal communication).

During 1995, as part of a three month sperm whale photo-identification study carried out aboard the sailing yacht *Balaena* in the Galápagos Islands, two female or juvenile male sperm whales were observed with extensive scarring on the head and anterior dorsal surface of their bodies (Fig. 1). The purpose of this note is to describe the unusual degree and nature of scarring on one of these females/juvenile males (based on photographs) and to discuss the possible causes of such scarring.

The first scarred whale was observed in a group of nine animals on 7 May 1995 (0°38'N, 90°37'W). The other members of this group did not have any noticeable scarring, were all approximately the same size (based on photographs of the whales lying parallel to one another), and were thought to be the size of adult females (8.6-10.2 m, Waters and Whitehead 1990). The heavily scarred individual had a distinctive callus on