# **Short Note**

## **Rope Rubbing Social Play Behavior Recorded from** Wild Bottlenose Dolphins (*Tursiops truncatus*) in Ecuador

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Rubbing body parts on animate and inanimate objects is part of the diversity of play behaviors recorded in several cetacean species both in captivity and in the wild, a practice quite widespread particularly among delphinids (Paulos et al., 2010; Dudzinski et al., 2012). Studies of captive dolphins confirm that play is more frequently performed by young animals (Tavolga, 1966; Kuczaj & Eskelinen, 2014). In the wild, however, play behavior is not always easy to assess because focal animals are difficult to follow below the water's surface. Nevertheless, Dudzinski (1998) reported that contact behaviors are more frequent between animals of the same sex and age in wild Atlantic spotted dolphins (Stenella frontalis). Rubbing with body parts is one of the most frequent play behaviors recorded in the wild; this includes different bottom surfaces and floating objects such as seaweed, logs, and plastic buoys (Paulos et al., 2010; Greene et al., 2011; Kuczaj & Eskelinen, 2014). A well-known case of rubbing play occurs in killer whales (Orcinus orca) that rub their bodies on the rocky seabed in Canada (Hoyt, 1981). Functionality of rubbing has been associated with hygiene, development of social skills, help in facilitating molting, and as a play activity (Kuczaj et al., 2006; Dudzinski et al., 2012). In captivity, dolphins play with ropes placed deliberately in the pool; but in the wild, rope rubbing has not been previously reported.

The presence of a resident population of bottlenose dolphins (*Tursiops truncatus*) in the inner estuary of the Gulf of Guayaquil, Ecuador, has been known for decades (Félix, 1994). Similar to other estuarine areas (e.g., Irvine et al., 1981; Fruet et al., 2011), this population is structured in communities of about 100 animals. Dolphin communities are organized as bands of females with calves occupying specific areas within the community home range (Félix, 1997). Posorja (2° 42' S, 80° 14' W) is mostly a fishing town located at the northern entrance to the inner estuary of the Gulf of Guayaquil, an estuarine area of high productivity (Stevenson, 1981) (Figure 1). The area is near to the coastal marine protected area El Morro Mangrove Wildlife Refuge, where ecotourism activities are popular, including bird and dolphin watching. Intense maritime traffic characterizes the area because of the presence of artisanal and industrial fishing fleets. Also, Posorja is located in the ships' access channel to Guayaquil City, the largest port facility of Ecuador, 80 km upstream.

On 29 September 2014, during a dolphinwatching trip at Posorja, some members of a group of bottlenose dolphins were observed rubbing their bodies repeatedly along floating ropes. When the subgroup was approached, it seemed that a dolphin was entangled because the animal was whirling its body with a rope close to the surface. However, it soon became clear that it was not tangled. The group contained about a dozen dolphins, mostly mothers with calves and immature individuals. This group belongs to a well-known band of mothers and calves that the author has observed for several years around this village (Félix, 1994, 2013). The site was near the dockyards area north of Posorja, where dozens of trawlers and purse seiners dock. Despite intense port activity in the area, this band of females has been repeatedly observed here in different contexts-feeding, traveling, socializing, and resting (Félix, unpub. data, 2011-2014). Additionally, this is a preferred site by dolphin-watching operators.

During the observation, the bottlenose dolphin group was dispersed within about a 200-m radius in pairs and trios. Despite the strong tidal current, which in this area can reach 7.5 km.h<sup>-1</sup> (Stevenson, 1981), dolphins remained in the area milling back and forth during the observation (33 min). Polypropylene ropes of 5-cm diameter hung from a floating mooring buoy. The larger rope (about 20 m in length) had both ends tied to the buoy



Figure 1. The location (Posorja) of the rope rubbing observation in the Gulf of Guayaquil

forming a collapsed loop, so there was no tension in the rope. Whenever the group passed the rope, several individuals approached the rope to rub, sometimes more than one individual simultaneously. Because the rope was floating, the rubbing behavior was performed mostly at the water surface. Dolphins raised the rope in such a way that it molded to the curvature of their bodies, seemingly maximizing the surface of contact. Dolphins rubbed the rope from rostrum to tail, both dorsally and ventrally (Figure 2). During rubbing, dolphins whirled their bodies around trying to touch the rope with different body parts, and returned to rub repeatedly. From the information contained in the photographic material, it was estimated that rubbing bouts lasted between 79 and 191 s (Table 1), after which dolphins continued movement away from the area.

Since the boat approached to a short distance during the sighting period, usually within 30 m from the animals, it is not ruled out that the boat affected the dolphins' behavior or duration of rubbing. The lack of underwater visibility related to murky water precluded confirming the position of dolphins with respect to other members of the group when rubbing. At least two mothers identified in the catalogue of the Whale Museum of Salinas with ID numbers P16 and P61, and an immature (ID# P69) and one smaller unmarked animal (the second two individuals assumed to be offspring of the females) engaged in rope rubbing. Dolphins repeated rubbing in three bouts during the observation session. Dolphin ID# P61 was involved in the three occasions (Table 1). Photographs and video were collected to document the behavior. A video is available as support material to this article (www.aquaticmammalsjournal. org/index.php?option=com content&view=article &id=10&Itemid=147).

Studies in both captivity and in the wild show that bottlenose dolphins are social mammals, which engage in a variety of complex social behaviors from an early age, including mimicry of other dolphins, object play with manipulation of artificial objects, vocal learning, tool use, and more (e.g., Tavolga, 1966; Herman, 1980; Pack

Table 1. Information on the duration of three rubbing periods, individuals involved, and materials used for behavioral analysis

Period	Lasting time	Individuals	Materials available
1	1330:04 -1331:24 h	ID# P61 and one unidentified dolphin	19 photos, video (17 s)
2	1335:32 -1338:46 h	ID# P16, P61, P69, and one unidentified dolphin	55 photos, 3 videos (80 s)
3	1344:10 -1345:29 h	ID# P61 and P69	28 photos, video (27 s)



Figure 2. Different moments when individuals of a group of bottlenose dolphins (*Tursiops truncatus*) approached for rubbing dorsally (left) and ventrally (right) with a floating rope

& Herman, 2006; Mercado & DeLong, 2010; Paulos et al., 2010; Mann et al., 2012; Kuczaj & Eskelinen, 2014). For the wild dolphins at Posorja, rope rubbing seemed deliberately performed by dolphins. They were in control of the situation despite the rope being an artificial element in their habitat. It was not clear which individual dolphin initiated the activity-one of the adults or an immature individual-but rubbing the rope seemed to provide a pleasant stimulus to both age groups. During other occasions, the author has seen dolphins of this community manipulating floating objects such as plastic bags and water hyacinths (Eichornia crassipes) with different parts of their body (Félix, 2013). Unlike those observations when the animals approached objects individually, at least four different dolphins were involved in rubbing the rope. The particular characteristics of the rope regarding length, thickness, material roughness, and absence of tension might have created proper conditions to encourage a group activity. It seemed that the dolphins did not perceive the floating rope as a threat but, rather, as an opportunity to play or to rub off dead skin. Because rope debris has been reported in this port area before this observation, it is possible that this is not the first time these dolphins rubbed mooring ropes.

Dudzinski et al. (2012) compared dolphin self-rubbing (a single dolphin contacting one or multiple parts to something other than another dolphin) and social rubbing (pectoral fin contact between dolphin pairs) and concluded that both actions have different functions, with self-rubbing typically not possessing any social function. The case reported herein falls into the self-rubbing category because an inanimate object was used by dolphins. Since the described activity involved mothers with calves interacting as a social unit in a recurrent manner, the behavior may well be referred to as social play (Bekoff, 2001). During rubbing periods, dolphins took turns and shared the ropes, suggesting that the observed behavior could have a learning component and may help to reinforce social bonds between members of the group. In captivity, bottlenose dolphins have been seen rubbing ropes both individually or as a social activity, sometimes competing to get the best part of the rope (K. Terrell, pers. comm., 23 October 2014). According to Kuczaj & Eskelinen (2014), play would provide more than pleasure to dolphins and would serve multiple purposes, including development of cognitive skills to identify and interact with other members of the group. In the wild, social play may help calves in the learning process to determine their place in the social network (Kuczaj & Eskelinen, 2014). The observed rubbing behavior may have a similar connotation as other social play behaviors performed by dolphins such as aerial displays, riding waves, and self-beaching (see a review of cetaceans' play behaviors in Paulos et al., 2010). The event reported herein also shows that wild bottlenose dolphins, similar to captive dolphins, have the ability to improvise play behaviors with inanimate objects as part of their complex social life.

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#### Literature Cited

- Bekoff, M. (2001). Social play behaviour: Cooperation, fairness, trust, and the evolution of morality. *Journal of Consciousness Studies*, 8, 81-90.
- Dudzinski, K. M. (1998). Contact behavior and signal exchange in Atlantic spotted dolphins (*Stenella frontalis*). Aquatic Mammals, 24(3), 129-142.
- Dudzinski, K. M., Gregg, J., Melillo-Sweeting, K., Seay, B., Levengood, A., & Kuczaj II, S. A. (2012). Tactile contact exchanges between dolphins: Self-rubbing versus inter-individual contact in three species from three geographies. *International Journal of Comparative Psychology*, 25, 21-43.
- Félix, F. (1994). Ecology of the coastal bottlenose dolphin *Tursiops truncatus* in the Gulf of Guayaquil, Ecuador. *Investigations on Cetacea* (G. Pilleri, Ed.), 25, 235-256.
- Félix, F. (1997). Organization and social structure of the bottlenose dolphin *Tursiops truncatus* in the Gulf of Guayaquil, Ecuador. *Aquatic Mammals*, 23(1), 1-16.
- Félix, F. (2013). Los bufeos del Golfo de Guayaquil, guía de campo [The bottlenose dolphins of the Gulf of Guayaquil] [Electronic version]. 41 pp. Available from www.museodeballenas.org.
- Fruet, P. F., Secchi, E. R., Di Tullio, J. C., & Kinas, P. G. (2011). Abundance of bottlenose dolphins, *Tursiops truncatus* (Cetacea: Delphinidae), inhabiting the Patos Lagoon estuary, southern Brazil: Implications for conservation. *Zoologia*, 28(1), 23-30. http://dx.doi. org/10.1590/S1984-46702011000100004
- Greene, W. E., Melillo-Sweeting, K., & Dudzinski, K. M. (2011). Comparing object play in captive and wild dolphins. *International Journal of Comparative Psychology*, 24, 292-306.
- Herman, L. M. (1980). Cognitive characteristics of dolphins. In L. M. Herman (Ed.), *Cetacean behavior: Mechanisms and functions* (pp. 363-430). New York: Willey Interscience Publication. 463 pp.
- Hoyt, E. (1981). Orca the whale called killer. North York, ON: Camden House Canada Publishing Ltd. 287 pp.
- Irvine, A. B., Scott, M. D., Wells, R. S., & Kaufmann, J. H. (1981). Movements and activities of the Atlantic bottlenose dolphin, *Tursiops truncatus*, near Sarasota, Florida. *Fishery Bulletin*, 79(4), 671-688.
- Kuczaj II, S. A., & Eskelinen, H. (2014). Why do dolphins play? Animal Behavior and Cognition, 1(2), 113-127. http://dx.doi.org/10.12966/abc.05.03.2014
- Kuczaj II, S. A., Makecha, R. N., Trone, M., Paulos, R. D., & Ramos, J. A. (2006). The role of peers in cultural transmission and cultural innovation: Evidence from dolphin calves. *International Journal of Comparative Psychology*, 19, 223-240.
- Mann, J., Stanton, M. A., Patterson, E. M., Bienenstock, E. J., & Singh, L. O. (2012). Social networks reveal a culture club in tool using dolphins. *Nature Communications*. http://dx.doi.org/10.1038/ncomms1983
- Mercado III, E., & DeLong, C. M. (2010). Dolphin cognition: Representations and processes in memory and

perception. International Journal of Comparative Psychology, 23(3), 344-378.

- Pack, A. A., & Herman, L. M. (2006). Dolphin social cognition and joint attention: Our current understanding. *Aquatic Mammals*, 32(4), 443-460. http://dx.doi. org/10.1578/AM.32.4.2006.443
- Paulos, R. D., Trone, M., & Kuczaj II, S. A. (2010). Play in wild and captive cetaceans. *International Journal of Comparative Psychology*, 23, 701-722.
- Stevenson, M. R. (1981). Variaciones estacionales en el golfo de Guayaquil, un estuario tropical [Seasonal variations in the Gulf of Guayaquil, a tropical estuary]. Boletín Científico y Técnico, Instituto Nacional de Pesca del Ecuador, 4(1), 5-32 + figures.
- Tavolga, C. M. (1966). Behavior of the bottlenose dolphin (*Tursiops truncatus*): Social interactions in a captive colony. In K. S. Norris (Ed.), *Whales, dolphins, and porpoises* (pp. 718-730). Los Angeles: University of California Press.