

ORINOCO RIVER DOLPHIN (*Inia geoffrensis humboldtiana*) BEHAVIOURAL CATALOGUE

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INTRODUCTION

In ethological studies, the use of a clear description, classification and measurement of behaviour is crucial for achieving trustworthy and comparable results. During the EAAM Annual Symposium in the year 2006, a specific behavioural catalogue was presented for *Tursiops truncatus*. The present contribution represents the linear continuation of that work extended to another cetacean species, *Inia geoffrensis humboldtiana*, a rare dolphin taxon characterized by fluvial habits. The aim was to provide a tool, supplied with both written and video explanations, able to make the behaviours' identification easier and non-ambiguous and to support quantitative research.

METHODS

An extensive review of river dolphins' bibliography was executed while further knowledge was obtained in May 2006 by an ethological study consisting in 120 hours of focal observations on two adult males of *Inia geoffrensis humboldtiana* (approx. 35 and 55 years old) housed at Duisburg Zoo (Germany).

RESULTS AND CONCLUSIONS

A total of 70 behavioural descriptions came to compose the specific Orinoco river dolphin behavioural catalogue while the archive of underwater video images recorded during the study, closely examined for searching clear performances of behaviours, provided video sequences of each distinctive activity.

Since conservation requires a real effort in combining and sharing material and data on environments and species, the final step of our project consisted in making the behavioural catalogue easily available to interested people. Therefore, behavioural tables and motion pictures are now free for downloading at:

http://www.delfinariorimini.it/behavioural_catalogue.htm

#	CODE	BEHAVIOURAL UNIT	DEFINITION	SPECIFIC REFERENCE	See the Video
LOCOMOTORY & POSTURAL BEHAVIOUR					
1	SWM	Directional swim	Swimming in regular circular pattern around the tank.	Caldwell M.C., Caldwell D.K. & Evans R.L. 1964	
2	BUP	Random swim	Dolphins showed frequent changes in heading that sometimes appeared as random behaviour between other behavioural states.	Conradi R., Brunton H., Daniels T. 2004	
3	EXP	Exploratory behaviour	Scanning perpendicular/horizontal relative to bottom.	Hasting D.L. 1995	
4	TRU	Tank rub	They often rub their bodies against an object: floor, the bottom, the side of the basin. When swimming on the side, belly in front of the wall, they keep a contact of their flippers with the wall.	Sylvester J.F. 1985	
5	SIN	Sink	Vertical descent through the water column from the surface or interface by a dolphin [...] without making forward progress.	Miller M.H., Weaver A., Candiano N. 1998	
6	LIE	Lie	The animals often rest together on the bottom of the basin, turning the head in different directions, observing the other "lions" or anything in the pool.	Sylvester J.F. 1985	
7	VST	Vertical stand	Dolphin hangs/suspends itself vertically with its head up or down in mid-water column.	Miles J.A. & Herzog D.L. 2003	
8	RST	Rest	The animals floated at the surface of the water without any body movement. The blowhole only was exposed to the air. The breathing frequency was reduced, and the small eyes appeared to be closed.	Benjam L., Gaultier W., Neuhoff R., Winkler A. 1994	
9	FKO	Floke out	Bolus show the tail above the surface.	de Silva W.M.F. 2002	
10	OMI	Open and close mouth	Sometimes the orinoco dolphin was motionless with the jaws open for a long time (10-20 sec) and gently shaking his head to left and right.	Sylvester J.F. 1985	
11	DAR	Dorsal arch	Head and flukes bent backwards extending the belly region and compressing the back.	Miles J.A. & Herzog D.L. 2003	
12	VAR	Ventral arch	Dolphin body aligns in a crescent shape usually head up and perpendicular to the sea floor. Head and flukes are bent forward; the back and compressing the belly region.	Miles J.A. & Herzog D.L. 2003	
13	FLX	Flexion	The fluke and caudal peduncle moved ventrally and as the flexion reached its maximum, the tail approached an angle of 45 degrees from the horizontal. Often the head also bent ventrally. At the maximum the entire body formed an arch, and the muscles are taut. Then the animal relaxed and the tail was raised dorsally.	Toviss G.L. & Eustace P.L. 1957	
14	SPY	Spy-hop	Bolus show the head above the surface.	de Silva W.M.F. 2002	
15	LOO	Loop	The cetacean emerging out of the water on an acute angle, brings its ventral side to the surface. If then returns into the water describing a large loop.	Nordzee G.B. & Klinghammer J. 1979	
16	SOM	Somersault	tail dorsally/ventrally over head or a somersault.	Caldwell M.C., Folgers F.J. 1994	
17	ROL	Roll	The body is rotated through 360° on the longitudinal axis to either side of the dolphin.	Benjam L., Gaultier W., Neuhoff R., Winkler A. 1994	
18	STP	Stop	Suddenly stops dead in water after swimming forward.	Caldwell M.C., Folgers F.J. 1994	
19	JRK	Jerk	This behaviour consisted of any slight, rapid jerking of the body.	Nelson D.L. & Lien J. 1990	
20	HJR	Head-Jerk	A rapid lateral or vertical jerk of the head.	Connor R.C., Wells R.S., Mann J.A. & Reid A.J. 2000	
21	FJK	Pectoral-jerk	Rapid, jerky movements back and forth with, generally extended flippers.	Caldwell M.C., Folgers F.J. 1994	

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SOCIAL BEHAVIOUR					
22	CNT	Contact	They frequently keep a contact of a part of body (in particular the flippers) with the body of their companion.	Sylvester J.F. 1985	
23	RUB	Rub	The Orinoco dolphins rub their bodies against the body of the other companion.	Sylvester J.F. 1985	
24	BND	Bond	Sometimes they swim by keeping a contact of [...] fluke or flippers in front with the body of its companion as the post swim together.	Sylvester J.F. 1985	
25	NUD	Nudging	Nudging each other's bodies with its snouts.	Waring R. & Waring M. 1989	
26	NBL	Nibbling	The male nibbling the female's flipper and flukes.	Beal R.C. & de Silva W.M.F. 1989	
27	MOU	Mouthing	One dolphin laying his beak for a short time between the open jaws of the other.	Pilleri G. 1980	
28	BGP	Beak-genital propulsion	An animal invites a second animal to come up from below it and place the tip of its rostrum in its genital slit. The lower animal often turns partially on its side, sometimes supporting the horizontal flukes of the upper animal from its head. The beak of the pectoral flippers. In this position, the lower animal, its tail bent down slightly from the horizontal, propels the upper animal forward, only breaking from the pattern to rise for breaths of air. Sometimes it swims belly up or down-up during such propulsion.	Johnson C.M. & Norris S. 1994	
29	FYG	Playback	Two dolphins riding on top of each other, either three adult males swimming above one of the subadults, or vice versa.	Pilleri G. 1980	
30	FOI	Pointing	Dolphins point their head to head with respect to one another.	Doutsiński K.M. 1994	
AGGRESSIVE BEHAVIOUR					
31	DOM	Direct open mouth	Opened mouth directed at another, often with abrupt vertical head.	Somerville A. & Gillard T. 1997	
32	JCL	Jaw clap	Dolphin opens and shuts its jaws rapidly [...] once or twice in a row, usually with lip clapping sound.	Miles J.A. & Herzog D.L. 2003	
33	CHA	Chase	Into swam synchronously around the tank and chase.	Beal R.C. & de Silva W.M.F. 1989	
34	PUS	Push	Pushing body with its melon, dorsal pectoral fins and body.	Doutsiński K.M., Mossak R., Kozłowski J. & Kozłowski M. 2003	
35	RHT	Rostum hit	One dolphins hit another dolphin with its rostrum.	Doutsiński K.M. 1994	
36	THI	Tail hit	One dolphin uses its fluke to hit another dolphin's head or body, can be done mid-water, column or at the water surface.	Miles J.A. & Herzog D.L. 2003	
37	BSL	Body slam	A charging dolphin slams into another with any part of its body other than its rostrum, peduncle and tail, fins and pect.	Connor R.C. 1990	
38	BIT	Bite	One animal bites the open jaws across another animal's body or extremities; often leaving parallel lines.	Fryer K. 1990	
39	CLS	Clasp	A mother swims belly up to the calf with the calf between the pectoral fins.	Mann J.A., Wells R.S. & Reid A.J. 1999	
40	HLD	Hold down	Force the smaller animal toward the bottom.	Caldwell M.C., Caldwell D.K. & Evans R.L. 1964	

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SEXUAL BEHAVIOUR					
41	BTB	Belly to belly swim	Two dolphins swimming slowly anticlockwise belly to belly, with the adult male swimming on its front above one of the subadults swimming on its back.	Pilleri G. 1980	
42	GIN	Genital inspection	Includes one dolphin inspecting the genital region of a second while producing a burst pulsed sound. No physical contact is observed.	Doutsiński K.M., Thomas J.A. & Doucet E. 2002	
43	GOO	Goose	Rostro-genital contact in which one individual moves its rostrum into the genital area of another, gently or roughly.	Connor R.C., Wells R.S., Mann J.A. & Reid A.J. 2000	
44	GRD	Genital rub on dolphins	Genital rubs (on conspecific).	Hasting D.L. & Johnson C.M. 1997	
45	ERE	Erection	Slowly swimming, the penis began to protrude out of the genital orifice. Just after, the cetacean bent itself in two parts, the head and the flukes pointed down, during 3 to 4 sec returned to its normal position.	Sylvester J.F. 1985	
46	FIN	Penis insertion	The adult male tried briefly to insert its erect penis into the blowhole of one of the juvenile male. The adult male swimming underneath the younger inserted its penis (in erection) into its genital hole, the male, in such case, was observed attempting insertion into the female's blowhole or between her tail flukes.	Sylvester J.F. 1985, McCusker, 1992	
47	FMO	Fin/fluke mount	Slowly progressing animal object for the first time with the tip of its dorsal fin or flukes of one dolphin inserted into the genital slit of its partner.	Somerville A., Taylor G.S., Bowe G., 1973	
PLAY BEHAVIOUR					
48	COB	Circle object	Individual begins swimming round the [...] object in wide circles, in other words the object is now included in the swimming circle.	Pilleri G. 1980	
49	MOB	Mouth object	Individual raises itself out of the water to hold the object in its mouth.	Pilleri G. 1980	
50	ROB	Rub object	The adult male using its brush to make contact with the object of its young companions.	Pilleri G. 1980	
51	POB	Push object	She would [...] touch it with the tip of her beak, afterwards sending it staggering sideways with a smart blow of the beak, exactly like a golfer propelling the ball.	Pilleri G. 1980	
52	TOB	Transport object	Carrying a deck tennis ring on or underneath the head and placing a bucket over the beak can also be defined as accessories play.	Pilleri G. 1980	
53	SOB	Slap object	She released the ball which she had picked up to the surface.	Pilleri G. 1980	
54	OOB	Touch object	Individual touches the object for the first time with the tip of its beak (nudging).	Pilleri G. 1980	
55	WOB	Throw object	Play with a number of different toys, plastic balls, rings, rubber tubes, brushes, rusty bolts, thrown above the surface of the water.	Benjam L., Gaultier W., Neuhoff R., Winkler A. 1994	

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AERIAL BEHAVIOUR					
56	PSL	Pectoral slap	Slapping the pectoral fin on the water surface.	Mann J.A. & Smith S. 1999	
57	TSL	Tail slap	Flukes raised above the surface and the ventral/dorsal side slapped downward, usually making a loud, percussive sound.	Shane S.H. 1990	
58	RSL	Rostum slap	A dolphin, on its side or belly-up, raises its head out of the water and slaps the side of its head on the water surface. May be light or hard.	Connor R.C. 1990	
59	HSL	Head slap	The fore-section is elevated above the surface with the ventrum uppermost and dropped backward, landing noisily on the water surface. Occasionally, the animal will contact the dorsal or lateral position and rotate on the long axis before dropping back to the water surface.	Muller, M., Ruckewitz, H., Wenzel, A. & Candiano, N. 1998	
60	DSL	Dorsal slap	The fore-section is elevated above the surface with the ventrum uppermost and dropped backward, landing noisily on the water surface. Occasionally, the animal will contact the dorsal or lateral position and rotate on the long axis before dropping back to the water surface.	Muller, M., Ruckewitz, H., Wenzel, A. & Candiano, N. 1998	
BUBBLE RELATED BEHAVIOUR					
65	BUB	Bubble	Dolphins [...] expel air from their blowholes, generating large, amorphous bubbles that rise quickly to the surface.	Marten K., Shafr K., Fournelle S. & White D. 1994	
61	VSL	Ventral slap	A dolphin raises itself out of the water to slap the dorsal fin or leaps clear of the water and then slaps its belly on the water surface. May be light or hard.	Connor R.C. 1990	
62	SSL	Side slap	The dolphin comes out of the water and returns back to water on its side. Very often, only half or three-fifths of the body slaps the side of the water; the tail usually remains underwater.	Berkovich J.M., Iwanawa H., Yelkman D.E., Kozłowski J. & Kozłowski S.F. 1997	
63	QLE	Quasi-leaps	When surfacing, the melon, tip of the rostrum and long dorsal keel are simultaneously in a very conspicuous way. The body does a high-arching roll in which these parts appear sequentially thrust well out of the water. The tail is rarely rolled out of the water prior to a dive.	de Silva W.M.F. 2002	
64	LEP	Leap	Entire body clears the water (or Height), and the head first with water streaming side facing down.	Shane S.H. 1990	
66	BUR	Bubble ring	Air bubbling ring produced by air from the blow-hole.	Gewart W. 1989	
67	BUS	Bubble stream	The animals also produced a column of small air bubbles coming from their blow holes (they were either blown all at once or gradually).	Doutsiński K.M. & Auspurgel J. 1997	
68	BUM	Bubble mouth	Into puts its rostrum out of the water, opens the long beak, and takes some air in the mouth. After that the animal dives to the bottom of the pool waiting for the end of the self-produced water turbulence. Then it opens a small part of one side of the mouth, bringing out air bubbles which rise in a row.	Gewart W. 1989	
69	BIN	Bubble interest	Dolphin shows interest for the air bubbles [...], and/or follows them to the water surface.	Face D.S. 2000	
70	BCN	Bubble contact	Dolphins touch/pushes through/pushes the bubbles (derived from the ring top) or the ring.	Face D.S. 2000	

