Tursiops truncatus (Bottlenose Dolphin)

Family: Delphinidae (Oceanic Dolphins)
Order: Cetacea (Whales and Dolphins)
Class: Mammalia (Mammals)

Fig. 1. Bottlenose dolphin, *Tursiops truncatus.*

[http://yourshot.nationalgeographic.com/photos/1230523/?source=gallery, downloaded 15 November 2014]

TRAITS. *Tursiops truncatus* (Fig. 1) are the most recognized of all cetaceans and are thus known worldwide by several common names such as the bottlenose dolphin, black porpoise and cowfish, to name a few. Identifying characteristics include a robust medium-sized body (under 2m to about 3.8m), short rostrum (nose or beak) and a clearly demarcated melon (forehead). These dolphins also typically possess light-grey to black dorsal and lateral coloration, a light-coloured belly, truncated teeth (shortened at the tips), convex flippers with pointed tips, and tail flukes with curved back margins, notched at the middle (Ridgway and Harrison, 1999). *Tursiops truncatus* use these features in communication via sound and physical contact. There is no pronounced sexual dimorphism in adults since both males and females develop similar physical features like ventral speckles.

ECOLOGY. Bottlenose dolphins typically occupy coastal habitats but are also found in pelagic waters (open ocean). These habitats are mostly warm, tropical marine or temperate waters of the North Pacific, Indian and North Atlantic Oceans as well as the Red, Black and Mediterranean Seas (Ridgway and Harrison 1999). In addition, bottlenose dolphins are adapted to estuarine habitats. There were sightings in the south-eastern Caribbean off the islands of Guadeloupe, Grenada, Dominica, Martinique and Trinidad and Tobago (Boisseau et al., 2006). Their geographic location is limited by surface temperature (with a preferred range between 10-32°C) and prey availability.

SOCIAL ORGANIZATION. Bottlenose dolphins are very social animals moving in groups of 2-15 individuals and even in larger groups of up to 1000 or 10,000 as observed near South Africa and in the Pacific Ocean, respectively. Small groups are typically located near the coast while larger ones are in offshore waters. Although these dolphins have discrete social units, they are not reproductively isolated from other groups (Ridgway and Harrison, 1999). Both males and females are philopatric (have a tendency stay in, or return to, its home area) (Connor et al., 2000). The major type of grouping pattern observed is that of "fission-fusion" where the composition of groups regularly change (Wells et al 1990). Studies conducted at Shark Bay in Australia and Sarasota Bay in Florida by Smolker et al. (1992) and Wells et al. (1987), yielded several types of relationships. While some females preferred to be in groups, others remained solitary. Female-female associations were extensive, comprising of "band" links. Within the same band, those females with calves similar in age grouped together. Bonds with other females showed benefits such as protection from predators and chasing away of persistent males. Males typically cooperated in attainment of females and in defence. Strong associations between differing genders were typically prevalent during the mating season when females were receptive. Males and females may travel, forage and rest together (Connor et al., 2000). A study done by Scott and Chivers (1990) found them in groups of mixed species in pelagic waters in the eastern tropical Pacific. The most common was the bottlenose dolphin-pilot whale relationship. The status of a particular individual depended upon alliances, the particular circumstance; e.g. reproductive state, presence of a newborn, outcomes of an agonistic (conflict) interaction and access to resources. A dominance study performed with dolphins in captivity showed the persistence of male dominance where two males were always dominant over the females in spite of sickness and larger size of the females (Samuels and Gifford, 1997).

ACTIVITY. Bottlenose dolphins are mainly involved in activities such as foraging, social interactions, resting, travelling and displays (of excitement). During the day, their range is variable, as they travel in north-south movements within a 40km home range at a speed of approximately 2-5km per hour (Connor et al., 2000). In spite of having year-round home ranges, seasonal migration is also practiced, mainly with coastal dolphins and was found to have a relation with water temperature fluctuations (Ridgway and Harrison, 1999).

FORAGING BEHAVIOUR. The diet varies depending on availability but the most common prey are fish and squid from diverse habitats. Groups may feed at particular locations based on sex and size, for example, lactating females and calves (young) feed nearshore, while adolescents feed slightly offshore and adults even further offshore. Bottlenose dolphins feed singly or in groups and may pursue prey above water or into the sand whether they are found alone or in large schools (Connor et al., 2000). Individuals may rapidly manoeuvre themselves in high-speed chases after prey, followed by a "pin-wheeling" movement to capture prey at the surface. During

"pin-wheeling" the dolphin turns at a high rate within a small radius keeping its rostrum at a fixed point (Fig. 2). Maresh (2004) showed that, when paired, dolphins coordinated their efforts by circling and swimming side-by-side. Another strategy used is "fishwacking" where, the dolphin stuns the fish with its fluke (flat end of the tail), throwing it up to 9 m into the air (Fig. 3). They may also partially beach prey during capture and disorient them with percussive leaps (Ridgway and Harrison, 1999). In addition, dolphins swim upside down while chasing near the surface and belly up after fish that "skip" on surface and grab them in the air. Some dolphins have been found to bury themselves in sand and wait still for unknown prey and utilize sponges as a "tool" to protect their rostra from damage.

COMMUNICATION. Sounds produced are whistles, echolocation clicks and burst-pulse sounds. Caldwell and Caldwell (1965) stated that these dolphins produce specific whistles in order to communicate their identity, emotional state and even their location. In addition, to induce social interaction, they may mimic the whistles of other individuals. They also have the ability to label objects using signature whistles (Ridgway and Harrison, 1999). During male-female interactions, males may produce vocalizations of low frequency "pop" and exhibit threats in the form of head jerks, hitting and charges forcing the female to remain near (Connor et al., 2000).

SEXUAL BEHAVIOUR. Seasonal reproduction is practiced and breeding usually begins between 5-13 years of age, and all of the parental care is performed by the female. Their breeding season runs from September to December and there is generally a 12-month gestation period. One strategy adopted by males is coercion of females also known as "herding". Herding typically begins with the formation of a consortship which is an exclusive accociation between a male and a female (Connor et al., 2000). Studies demonstrated that consortships can be formed with a pair or trio of males and a single female and can last only a few minutes up to a month. The female is initially aggressively chased and captured once isolated from a group or there is a friendly display by the males. A pair of males generally follows the consorted female during the breeding season while dominating and effectively guarding her. The females may escape from males that monopolize them by increasing the number of times they have non-conceptive cycles. Herding imposes restrictions on a female in seeking favoured males. Other mating strategies believed to be adopted are affiliation without consortship. Interspecies sexual behavior has also been observed (Herzing and Johnson, 1997). During copulation, the dolphins position themselves belly to belly and have frequently been sighted bow riding (riding in the bow wave of a boat).

SURFACE BEHAVIOUR. Displays usually performed at the water surface and can be easily observed. One such type is known as the "rooster strut," where the dolphins travel side-by-side arching their head above the surface and bobbing it up and down. The "butterfly" display is performed by two males around a female making a set of movements appearing like figure eights. Another uncommon display is where two males perform "belly slaps" moving in opposite directions of the female. Displays of this type by males possibly serve to advertise health as well as vigour. Synchronous (at the same time) displays are characteristic of males while females may undertake asynchronous surfacing.

ANTIPREDATOR BEHAVIOUR. The primary predator of the bottlenose dolphins is the bull shark, *Carcharhinus leucas.* Several accounts have been made where dolphins demonstrated aggression towards sharks by head-butting them using their rostrum or attacking with their fluke. This behavior was correlated with high juvenile survival, where young were protected by their

mothers (Ridgway and Harrison, 1999). Following an attack or in times of threat, other dolphins may rush to a female and calf and form a school around them to chase the predator away. Bottlenose dolphins have been observed fleeing when a predator is in close range, when dolphins leapt away without stopping until they covered a distance of about 3km.

JUVENILE BEHAVIOUR. Single offspring tend to remain with their mother, nursing up to five years. During this time, mother and calf remain within 10m apart. The calf possesses a strong following sense but is capable of following any object that is moving rapidly. Mothers do not take offspring during foraging but they forage separately. Infants may whistle during separations (Connor et al., 2000).

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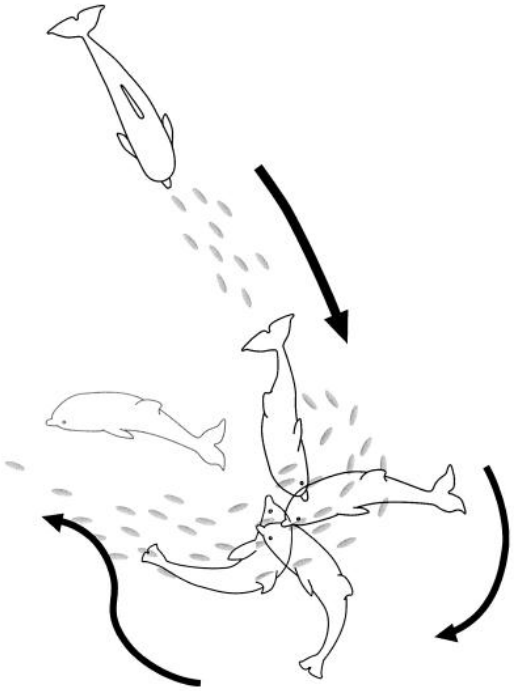

Fig. 2. Manoeuvres during pinwheeling by a single dolphin. Arrows show the direction of travel.
[Fig. 2 of Maresh (2004)]

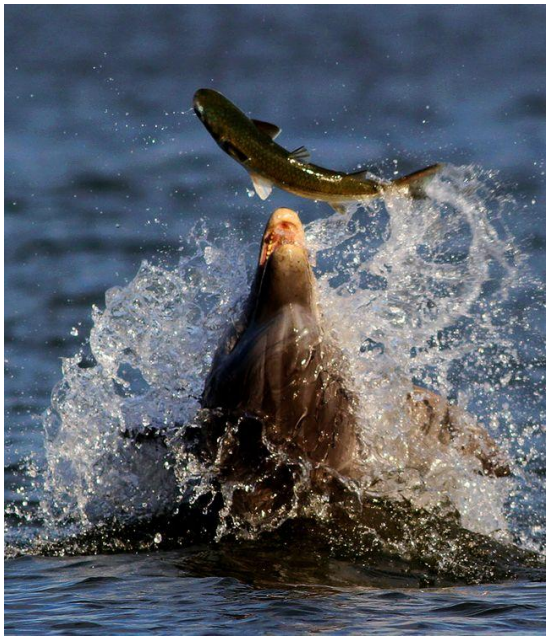

Fig. 3. Bottlenose dolphin feeding behaviour - above water.
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