

## *Stenella longirostris* (Spinner Dolphin)

Family: Delphinidae (Oceanic Dolphins and Killer Whales)

Order: Cetacea (Whales and Dolphins)

Class: Mammalia (Mammals)



**Fig. 1.** Spinner dolphin, *Stenella longirostris*.

[<http://www.arkive.org/spinner-dolphin/stenella-longirostris/> downloaded 18 September 2015]

**TRAITS.** *Stenella longirostris* is a small-bodied cetacean, characteristic of the *Stenella* genus, known for its acrobatic above-water displays of leaping and spinning about its body axis, thus its name the spinner dolphin. Generally reaching lengths of about 2m, and weight of 60-75kg. Head: very slender at apex of melon with elongated, thin rostrum (snout) with black lips (Fig. 1), with a mouth containing many small slender teeth (40-60 in each row). Body: slender with small flippers, and dorsal fin which may range from slightly falcate (hooked) to erect and triangular (Jefferson et al., 1993). Tripartite colour patterns: dorsal side grey, flanks light grey, and ventrally (underside) pale grey or white. Dark flipper stripe, of variable width, runs anteriorly from eye to flipper bordered by thin, light line. Individuals may be identified by their unique dorsal fin. Spinner dolphin males are larger than females, and may possess post anal hump which becomes more pronounced with age (WDC, Whale and Dolphin Conservation, 2015). Females possess obvious mammary slits parallel to, and on either side of the urogenital/anal opening. Four subspecies currently exist, in which coloration, size and shape of dorsal fins of *longirostris* differ amongst subspecies (Fig. 2.).

**ECOLOGY.** Spinner dolphins are pantropical, favouring tropical and subtropical waters all around the world, but do not occur in sub-Antarctic waters of South America. Their domain stretches through the Atlantic, Indian and eastern tropical Pacific (ETP) oceans (Fig. 3), with eastern inhabitants making up 44% of its population. They are primarily pelagic but extend to oceanic zones in search for prey, and display similar diurnal behaviour patterns to that of the New Zealand dusky dolphin (Evans, 2001). Spinners primarily feed on mesopelagic (mid-water) fish but also feed on cephalopods and crustaceans (Dolar et al., 2003).

**SOCIAL ORGANIZATION.** *Stenella longirostris* exhibits differing social structure and behaviours dependent on area of habitation. Generally they exercise a fluid, transitory “fission-fusion” structure, whereby individuals join in groups during night time feeding with hundreds of members, construed to promote efficient hunting in the pelagic environment, but disperse (fission) during daytime rest. Group size and composition may vary from day-to-day, particularly influenced by location of rest. Along the ETP, average group size consists of around 120 individuals but can encompass extensive groups of hundreds or thousands (Gerrodette and Forcada, 2005). Dolphins residing along the atolls in Hawaiian islands form one large, stable group in long-term association. Geographic insularity of the atolls and thus the peril and exhaustion brought by traversing these reefs, along with limited availability of secure resting habitat drives the re-enforcement of social bonds and long term stable communities at each atoll. These stable groups display familial units and learned associations, and supply increased protection in numbers where there is no shelter in open water from predation. Conversely, spinner dolphins which take up residence along islands, namely Hawaiian islands, display variation, with 30-70 individuals, allowing little intrusion from other dolphins beyond their small group (Karczmaski, 2005). Males may form groups, of yet unknown purpose, from a few to a dozen individuals, sometimes forming several core groups making up a school.

**ACTIVITY.** Rest in groups in a regular, tight formation while cruising slowly at bottom. Rest takes place only in wind protected, shallow areas with sandy bottoms to avoid predator detection (less than 50 m deep). When ascending, a small group will rise collectively, or in a large group, rise singly, surface to breathe and descend back to the bottom. Tight groups function for anti-predator strategy.

**FORAGING BEHAVIOUR.** This dolphin is carnivore, subsisting primarily on organisms of the mesopelagic boundary such as squid, and particularly on myctophids (lanternfish) that migrate to or near the surface at night, consuming one individual at a time. Sergestid shrimp and micronekton (miniscule free-swimming organisms) have also been noted in their stomach contents. Diel vertical migration displayed by their prey likely drives nocturnal hunting of *S. longirostris* thus placing a time constraint on their feeding. Consequently, spinners selectively forage on larger prey rather than random feeding from the prey population so to strategically capitalize their food intake to meet their energetic needs. Spinners also display vertical foraging range diving to 200-300m, in which one particular subspecies is known to feed on shallow and benthic reef organisms (Dolar et al., 2003). Opposed to offshore foraging for the entirety of the night, spinners monitor the movement of their prey thus allowing them to maximize their foraging time when prey are at the highest densities. Benoit-Bird and Au (2003b) have observed these dolphins diving in loose aggregations thereby increasing the density of prey by aggregation into small prey patches.

Extensive overlap in their diet is seen with the Fraser's dolphin, tuna and spotted dolphin (Norris, 1994).

**COMMUNICATION.** Both acoustic and non-acoustic forms of communication are employed by *S. longirostris*. Frequency-modulated (FM) whistles, compounded with mechanoreceptor, are used to relay an individual's identity and location, and thus maintain synchrony and coordination behaviour within the group. Whistles convey directionality, in the orientation and direction of movement of the signalling individual (Lammers and Au, 2003) in short-range. Sound is likely used when visual communication would be futile, primarily in the dark. Non-acoustic communication includes the use of tactile senses, by using fluke and flipper caresses, or tooth raking. Body position and language disclose a multitude of messages such as threat displays including halting, spreading pectoral fins, sigmoidal body posture, and nodding/ shaking head with open mouths, with or without sound (Pryor, 1990). Leaps and aerial actions are also exhibited in many forms such as nose-outs, head and tail slaps, fluke-up dive, head-over-tail leaps and their characteristic aerial spins which may be performed singly or in combination, in variable vigour and frequency through the day, relaying different messages. The spin entails the dolphin rushing to the surface, using momentum imparted by the water, leaping out and tipping its fluke slightly, flexing its tail stock to generate a spin of the airborne animal about its longitudinal axis (Fig. 4). Up to four revolutions may be made in each spin, and repeated a dozen times in succession. Spins are displayed by all age-classes, including calves. Spins are thought to produce noise upon landing thus generating omnidirectional communication over long distances and thus is employed in dispersed, spread groups when individuals may not be able to see each other (Norris, 1980).

**SEXUAL BEHAVIOUR.** Spinner dolphins display no confined breeding season, mating all year long exhibiting polyandrous, promiscuous mating, in which individuals freely move amongst several sets of partners over minutes to weeks. Females reach sexual maturity at 4-7 years whereas in males at 7-10 years (Benoit-Bird and Au, 2003a). Single pairs may occur but large mating groups are more popular including up to 20 females and 80 males. According to Silva et al. (2005) "in these groups, all males attempt to engage with females, such that a male subgroup would surround a female with each male trying to copulate with the female consecutively" (Fig. 5). True courtship behaviour is displayed prior to copulation in the form of a male caressing or touching the flippers or body of the female with his own flippers or nibbling at her flippers, along with nudging and biting her genital slit with his beak.

**PLAY BEHAVIOUR.** Calves often practise adult behaviour patterns, playing in open areas or generally encircled by more mature members. They frolic by manoeuvring, leaping and swimming away from mothers in sudden bursts of speed, along with chasing other calves. Tail wiggling and tilting are exaggerated, quickly beating its tail to change its course. Calves also touched others' bodies and flippers, and genital slits in imitation of adult mating rituals. Both juveniles and adult presented "toy-play" entailing the taking up of floating seaweed and hold onto its flipper for some time, thereafter releasing it and placing into other flipper, tail or beak. This form of play may be repeated and the play item may be taken up by another dolphin. 'Mock' fish chasing was also practised by both juveniles and adults upon black durgons which commonly associate with spinner dolphins in the bay and so are convenient play objects. Spinners would chase durgons for short distances, touching with beaks occasionally. Capture was rare but in occurrence, the durgon was promptly released unharmed and unstartled (Silva et al., 2005).

**NURSING BEHAVIOUR.** Calving occurs year long, with gestation of around 11 months (NOAA Fisheries, 2014). Females devote 3 years to calving in which calves remained close to mothers, suckling from new born to juvenile age. This often occurs during the day time in the bay resting area. Females would habitually use the flippers to touch calf's fluke, dorsal fin or flippers in frequent contact (Norris, 1980), along with making soft sounds when the calf seemed distressed or returned from play. The calf would orient itself along mother's side, initiating suckling by prodding at mammary slit with beak. The calf's eyes remained wide open during suckling.

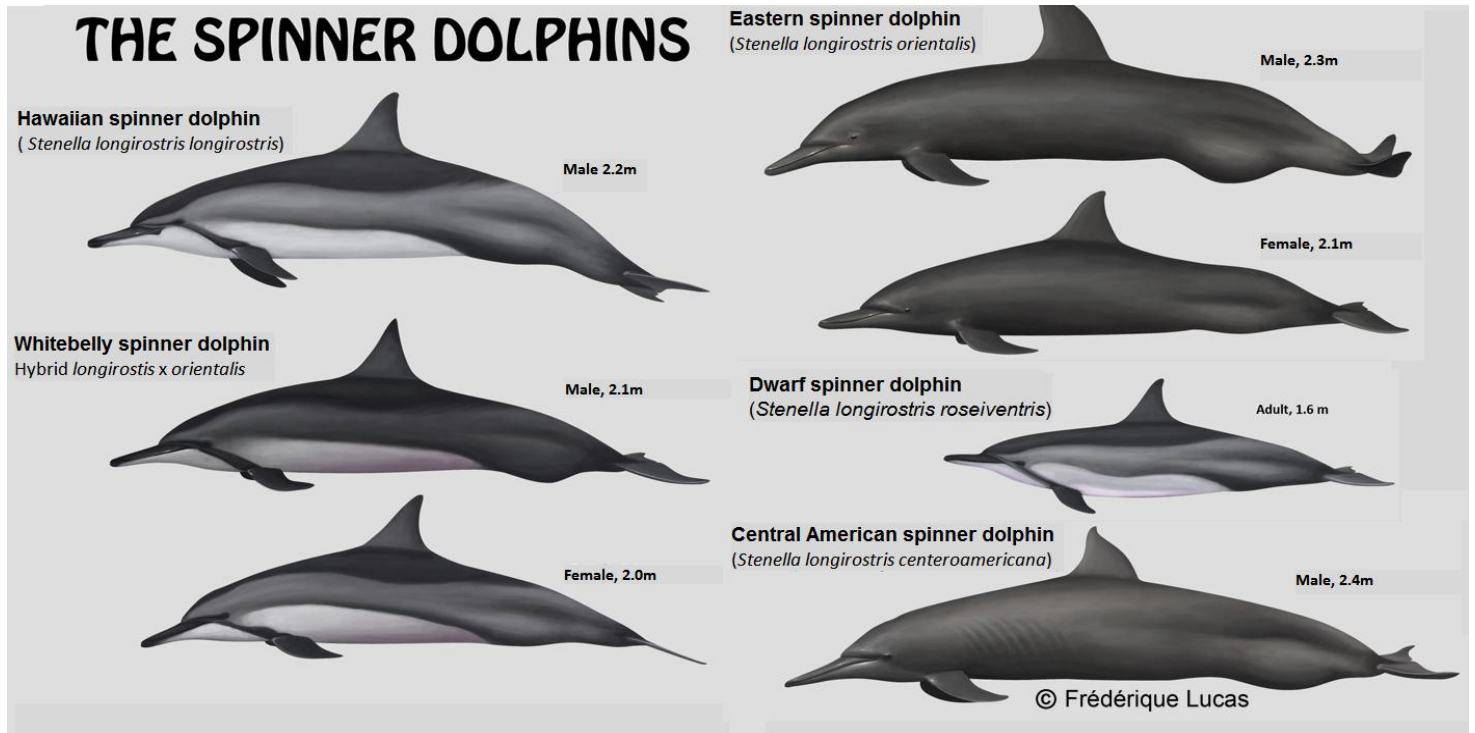
**AGGRESSION.** Aggressive behaviour towards each other is seen amongst males during mating in the mating subgroup, shown by opening beaks, biting, teeth-raking along body and bumping. Loud clicking and burst-pulses accompany aggressive displays, along with male-male penis intromission as a display of dominance (Psarakos et al., 2003). Small mating groups lacked this aggressive display. Notably, females preferred males showing stimulating and "inventive" traits, to which males in the group exploited by recognizing oddly behaving or appearing males and organized attempts to dissuading mating attempts of such individuals (Silva et al., 2005)

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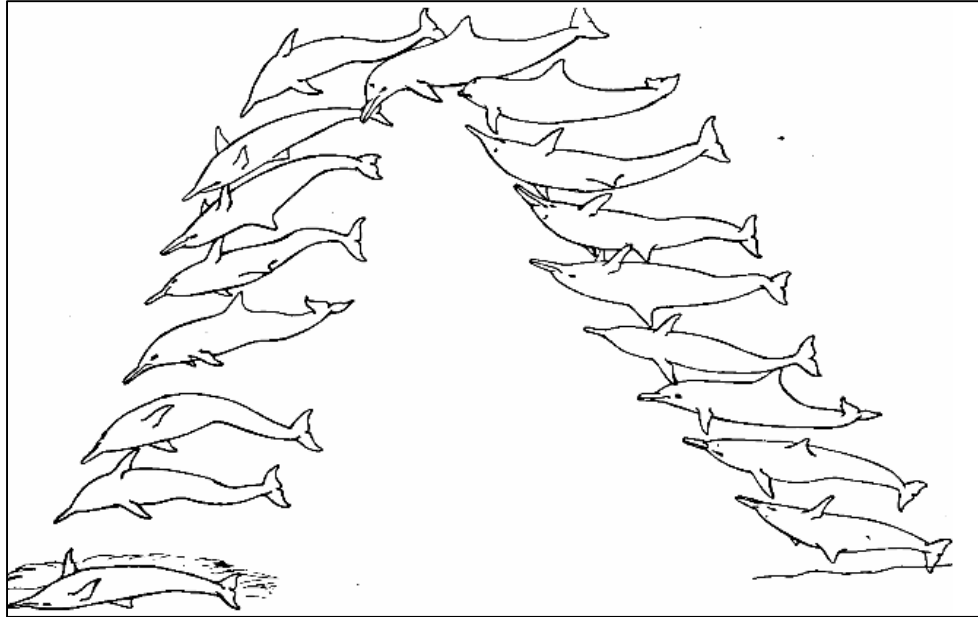
**Fig. 2.** Variations in coloration and size in subspecies of *Stenella longirostris*.

[<http://namu-the-orca.deviantart.com/art/The-spinner-dolphins-259047360> downloaded 2 October 2015]



**Fig. 3.** Distribution of *Stenella longirostris* (blue) across the four subspecies.

[<http://us.whales.org/species-guide/spinner-dolphin> downloaded 8 October 2015]



**Fig. 4.** Body postures of *S. longirostris* during spin. [From Norris, 1980]



**Fig. 5.** Mating group of spinner dolphins. Several males surround a copulating female and male (upside down). [From Silva et al., 2005]