

Two Presumed Interspecific Hybrids in the Genus *Stenella* (Delphinidae) in the Tropical West Atlantic

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Abstract

We describe and comment on two aberrant individuals of the genus *Stenella* from Fernando de Noronha Archipelago, tropical West Atlantic, which we regard as interspecific hybrids. Each dolphin was found living with a large group of spinner dolphins, *Stenella longirostris*. One of the aberrant dolphins is a presumed hybrid between *S. longirostris* and *S. attenuata*, and the second one is possibly a hybrid between *S. longirostris* and *S. clymene*. Each of the hybrids was accompanied by a spinner female. The *S. longirostris* × *S. attenuata* was first sighted as a calf and was re-sighted several times over two years. This individual was recorded being nursed by the female. The other hybrid was re-sighted a few times over three months.

Key Words: *Stenella longirostris*, *Stenella attenuata*, *Stenella clymene*, Cetacea, similar habits, hybridization

Introduction

Presumed or verified intergeneric or interspecific cetacean hybrids reported in the wild include Mysticeti (Balaenopteridae) and Odontoceti (Delphinidae, Monodontidae, and Phocoenidae). As would be expected, instances of hybridization are more common between species with similar habits (e.g., life histories and habitat requirements) (review in Bérubé, 2002). Only one dolphin hybrid, *Phocoenoides dalli* × *Phocoena phocoena* (Phocoenidae) was verified by molecular analysis; the remaining instances have been inferred from morphological features. Records of presumed hybrids between delphinids in the wild include *Delphinus capensis* × *Lagenorhynchus obscurus* and *Tursiops truncatus* × *Grampus griseus* (Bérubé, 2002). One of the best documented instances among delphinids is that of a presumed

hybrid between *Lagenorhynchus obscurus* × *Lissodelphis peronii* (Yazdi, 2002).

During studies on the behavior of spinner dolphins (*Stenella longirostris*) (e.g., Silva-Jr. et al., 1996; Sazima et al., 2003; Silva-Jr. et al., 2005), we recorded two individuals living along with large spinner dolphin groups, which we regard as interspecific hybrids within the genus *Stenella*. One individual had several mixed features of *S. longirostris* and *S. attenuata* and was first sighted as a calf together with a spinner female. The other individual had several features resembling *S. clymene*, as well as *S. longirostris* and was sighted with a spinner female as well. The three *Stenella* species are sympatric in the tropical West Atlantic, including the oceanic islands (LeDuc, 2002; Reeves et al., 2002).

Materials and Methods

Observations were made in the Fernando de Noronha National Marine Park (see Maida & Ferreira, 1997, for map and description), off NE Brazil, tropical West Atlantic. Spinner dolphins (*Stenella longirostris*) were recorded year-round in a bay locally known as the Baía dos Golfinhos, a 15- to 25-m deep inlet (description in Silva-Jr. et al., 1996). The bay is regularly visited by groups of up to about 2,000 spinner dolphins engaging in several behaviors such as rest, aerial displays, and social interactions, including copulation and parental care (Lodi & Fiori, 1987; Silva-Jr. et al., 1996, 2005).

The period during which we recorded the aberrant individuals reported here spanned from August 2000 to August 2002, during medium and long-term underwater studies on spinner dolphins (e.g., Silva-Jr. et al., 1996; Sazima et al., 2003; Silva-Jr. & Sazima, 2004; Silva-Jr. et al., 2005). The record number for the presumed *S. longirostris* × *S. attenuata* hybrid is #490, and that of the presumed *S. longirostris* × *S. clymene* hybrid

is #532 in the dolphin file of the Centro Golfinho Rotador (CGR). Original photographs of the two individuals are on file in the CGR, and scanned versions are in the Museu de História Natural da Universidade Estadual de Campinas (ZUEC).

Results

Selected morphological features of the two aberrant dolphins recorded living along with the



Figure 1. The presumed *Stenella longirostris* × *S. attenuata* hybrid during three consecutive years: (top) a spinner female accompanied by the hybrid with a whalesucker attached to belly and a spinner calf on 10 August 2000 (note falcate dorsal fin of the hybrid); (center) the same female and the hybrid on 3 February 2001 (note prominent dorsal cape, narrow flipper, and wide fluke of the hybrid); and (bottom) the hybrid accompanied by the same spinner female on 6 July 2002. See Table 1 for additional morphological features.

spinner dolphins in the Baía dos Golfinhos were compared with the three supposed parent species (Table 1). Both the hybrids were males and presented several features intermediary between their supposed parent species (Figures 1 & 2).

The presumed *S. longirostris* × *S. attenuata* hybrid was recorded on 17 occasions between August 2000 and August 2002 (24 months), whereas the presumed *S. longirostris* × *S. clymene* hybrid was recorded on five occasions between December 2000 and March 2001 (three months).

The *S. longirostris* × *S. attenuata* hybrid always was recorded accompanied by the same spinner female (#489) and was once observed suckling (November 2000). The female was recorded making physical contact with the hybrid



Figure 2. The presumed *S. longirostris* × *S. clymene* hybrid: (top) a spinner female accompanied by the hybrid on 25 January 2001; (center) the hybrid on 15 February 2001 (note little pronounced dorsal cape and the slight dip in ventral margin of the cape below the dorsal fin); and (bottom) the hybrid on 5 December 2000 (note evident “moustache-like” lateral markings on upper beak). See Table 2 for additional morphological features.

Table 1. Distinctive features of the spinner dolphins (*Stenella longirostris*), pantropical spotted dolphins (*S. attenuata*), clymene dolphins (*S. clymene*), and two aberrant individuals recorded in the Baía dos Golfinhos at Fernando de Noronha Archipelago, tropical West Atlantic

Morphological features	<i>Stenella l. longirostris</i>		<i>S. clymene</i>		<i>S. longirostris</i> X <i>S. attenuata</i>		<i>S. longirostris</i> X <i>S. clymene</i>		
	<i>Stenella l. longirostris</i>	<i>S. attenuata</i>	<i>S. clymene</i>	<i>S. clymene</i>	<i>S. longirostris</i> X <i>S. attenuata</i>	<i>S. longirostris</i> X <i>S. clymene</i>	<i>S. longirostris</i> X <i>S. clymene</i>	<i>S. longirostris</i> X <i>S. clymene</i>	
Body shape	Slender ¹	Moderately slender ¹	Robust ¹	Robust ¹	Slender ⁵	Slender ⁵	Slender ⁵	Slender ⁵	
General color	Dorsal field dark gray; lateral field lighter gray; belly white to very light gray; ventral margin of cape dips over eye; stripe from eye to flipper base dark gray ^{1,2,5}	Dorsal cape dark gray; belly light gray; dorsal cape dips to flanks backward to dorsal fin; ventral color sweeps upward to caudal peduncle; spots on body; stripe from beak to below eye dark gray fading to flipper base ^{1,3}	Dorsal cape dark gray; flanks light gray; belly white; noticeable dip in ventral margin of dorsal cape below the dorsal fin; stripe from eye to flipper medium gray and much wider at flipper base ^{1,4}	Dorsal cape dark gray; lateral field light gray; belly very light gray; no spots or stripes; stripe from upper beak to eye gray forming eye patch ⁵	Dorsal cape dark gray; lateral field light gray; belly very light gray; no spots or stripes; stripe from upper beak to eye gray forming eye patch ⁵	Dorsal cape dark gray; lateral field light gray; belly very light gray; no spots or stripes; stripe from upper beak to eye gray forming eye patch ⁵	Dorsal cape dark gray; lateral field light gray; belly very light gray; no spots or stripes; stripe from upper beak to eye gray forming eye patch ⁵	Dorsal cape (less pronounced than in <i>S. clymene</i>) gray; flanks light gray; belly white; slight dip in ventral margin of cape below dorsal fin ⁵	Dorsal cape (less pronounced than in <i>S. clymene</i>) gray; flanks light gray; belly white; slight dip in ventral margin of cape below dorsal fin ⁵
Beak	Long; upper jaw dark gray, tip black; lower jaw white; dark gray line along upper part of lower jaw ^{1,2,5}	Medium-sized; upper jaw dark gray; tip white; lower jaw lighter gray ^{1,3}	Short; upper jaw light gray; tip black; lower jaw light gray; arched dark gray line along lower side of upper jaw and upper side of lower jaw; black band from beak tip to melon; pale gray “moustache” mark along both sides of band ^{1,4}	Short; upper jaw light gray; tip black; lower jaw light gray; arched dark gray line along lower side of upper jaw and upper side of lower jaw; black band from beak tip to melon; pale gray “moustache” mark along both sides of band ^{1,4}	Short; upper jaw dark gray; lower jaw light gray; tip white ⁵	Short; upper jaw dark gray; lower jaw light gray; tip white ⁵	Short; upper jaw dark gray; lower jaw light gray; tip white ⁵	Medium-sized; upper jaw light gray; tip black; lower jaw light gray; arched dark gray line along lower side of upper jaw and upper side of lower jaw; black band from beak tip to melon; pale gray “moustache” mark along both sides of band ⁵	
Dorsal fin	Subtriangular to slightly falcate ^{2,5}	Falcate ¹	Subtriangular (smaller than in <i>S. longirostris</i>) ⁴	Subtriangular (smaller than in <i>S. longirostris</i>) ⁴	Falcate ⁵	Falcate ⁵	Subtriangular and slightly falcate ⁵	Subtriangular and slightly falcate ⁵	
Flipper	Base wide; inner part deeply concave; upper side dark gray ¹	Base narrow; inner part slightly concave; upper side dark gray ¹	Base wide; inner part slightly concave; upper side light gray ¹	Base wide; inner part slightly concave; upper side light gray ¹	Base narrow; inner part slightly concave; upper side dark gray ⁵	Base narrow; inner part slightly concave; upper side dark gray ⁵	Base narrow; inner part slightly concave; upper side dark gray ⁵	Base narrow; inner part slightly concave; upper side dark gray ⁵	

Sources: ¹Reeves et al., 2002; ²Perrin & Gilpatrick, 1994; ³Leatherwood et al., 1982; ⁴Perrin & Mead, 1994; ⁵present paper

several times, touching the throat of the calf with its flipper. In nine out of the 17 records, the *S. longirostris* × *S. attenuata* hybrid and its accompanying female were joined by other spinner females with their accompanying calves (Figure 1). The *S. longirostris* × *S. clymene* hybrid was accompanied by the same spinner female on all sightings (#531) (Figure 2) but was never seen joining other females and their accompanying calves.

No simultaneous record of both hybrids was ever made in the Baía dos Golfinhos. Neither of the presumed hybrids was ever recorded spinning, a very characteristic behavior of *S. longirostris* (e.g., Norris et al., 1994; Silva-Jr. et al., 1996; Perrin, 2002a).

The *S. longirostris* × *S. attenuata* hybrid carried whalesuckers (*Remora australis*) several times, one at a time (Figure 1). One of the fish remained attached to the hybrid host for two months, the second one for about three months, and the last one for about two months (see Silva-Jr. & Sazima, 2004 for remora fidelity to the same individual host).

Discussion

Wild cetacean hybrids attract attention especially when the involved species have different social behaviors (Bérubé, 2002); however, when the presumed hybrids involve species with very similar social behavior, hybridization is a more likely occurrence. The species within the genus *Stenella* are oceanic dolphins that share several social behaviors (e.g., Jefferson, 2002; Perrin, 2002a, 2002b), which would strengthen the hybridization hypothesis for the aberrant individuals reported here. Both *S. attenuata* and *S. longirostris* live in large groups, have a promiscuous mating system, and often school together (Wells & Norris, 1994a; Perrin, 2002a, 2002b).

Both presumed spinner dolphin hybrids shared intermediate characteristics with the presumed parent species, which is a common feature for cetacean hybrids (Bérubé, 2002), including a verified hybrid between *Phocoenoides dalli* and *Phocoena phocoena* (Willis et al., 2004); however, all instances of hybridization in Odontoceti both in the wild and in captivity refer to intergeneric hybrids (Bérubé, 2002). To our knowledge, our report is the first instance of presumed hybridization within a genus and the first between three species of the genus *Stenella*. We suggest that interspecific hybrids may be more common than generally thought but perhaps are regarded as variations or even anomalies within the same species. This may be an explanation for the high number of reported instances of intergeneric hybrids (when compared with intrageneric ones),

whose intermediate nature is probably more easily detected than that of interspecific hybrids (review in Bérubé, 2002). The repeated records of the two aberrant individuals over a relatively extended period allowed us to regard these as hybrids with more confidence instead of as variations or anomalies.

Both of the aberrant *Stenella* individuals described here had morphological features common to their presumed parent species as well as some intermediate characteristics. Thus, the presumed *S. longirostris* × *S. attenuata* hybrid had the body shape similar to *S. longirostris* and a general color resemblance to *S. attenuata*, but the presence of the light gray lateral field and very light gray belly is similar to *S. longirostris*. The color pattern of *S. attenuata* is highly variable, however, and newborns and some adults may be unspotted (Leatherwood et al., 1982; Reeves et al., 2002). The short beak seems particular to the hybrid since *S. longirostris* has a long beak and *S. attenuata* has a medium-sized beak. Both the dorsal fin and the flippers of the hybrid were similar to those of *S. attenuata*.

The presumed *S. longirostris* × *S. clymene* hybrid had the body shape similar to that of *S. longirostris*, and its general color was similar to that of *S. clymene* but with the dorsal cape less pronounced and the dip in the ventral margin of cape below dorsal fin slighter than that of *S. clymene*. The beak was intermediate in proportion to those of *S. longirostris* (long) and *S. clymene* (short). The dorsal fin was very similar to that of *S. longirostris*; however, the flippers were similar to that of *S. clymene* but with narrow bases, a characteristic particular to this individual.

S. attenuata does not spin (Perrin, 2002b), whereas *S. clymene* spins but its aerial displays are simpler than those of *S. longirostris* (Perrin & Mead, 1994). Since neither of the aberrant individuals was ever recorded spinning, their behavior may strengthen further our hybridization hypothesis.

The fact that the hybrids were never recorded simultaneously in the Baía dos Golfinhos may mean that their accompanying females belonged to different spinner groups, one of them possibly approaching the coastal areas more often (where *S. clymene* is more common) and the other with more oceanic habits (and thus with greater potential to join *S. attenuata* groups). The greater number of sightings and extended record period of the *S. longirostris* × *S. attenuata* hybrid would be explained by the supposed oceanic habits of the group to which the female belonged. For the *S. longirostris* × *S. clymene* hybrid, which had low sighting numbers for a short time, the explanation would be the supposed more coastal habits

of the group to which it belonged. Resident and transient groups, some of which are more coastal and the others more oceanic, already are reported for the Hawaiian populations of spinner dolphins (Wells & Norris, 1994b), which lends support to our above suggestion.

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