

## Pygmy and Dwarf Sperm Whales in Puerto Rico and the Virgin Islands, with a Review of *Kogia* in the Caribbean

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**ABSTRACT.**—Pygmy and dwarf sperm whales (*Kogia* spp.) are found in tropical and temperate waters but published records for the Caribbean are uncommon. As part of documenting 13 strandings of both species for Puerto Rico and the Virgin Islands, we reviewed 16 additional records from 6 Caribbean countries. Records of *Kogia* spp. exist for Colombia, Cuba, Dominican Republic, Mexico, Netherlands Antilles, and Saint Vincent. The documentation of the new data for Puerto Rico and the Virgin Islands, together with other stranding data from the Caribbean, provide important information on the life history of these pelagic cetaceans, including their feeding habits, parasitology, zoogeography, and threats to survival.

**RESUMEN.**—Los cachalotes enano y pigmeo (*Kogia* spp.) se encuentran en aguas templadas y tropicales pero los registros publicados para el Caribe son poco comunes. Como parte de la documentación de 13 varamientos de ambas especies para Puerto Rico e Islas Vírgenes, revisamos 16 registros adicionales de 6 países en el Caribe. Registros de *Kogia* spp. existen para las Antillas Holandesas, Colombia, Cuba, México, República Dominicana y Saint Vincent. La documentación de los nuevos datos para Puerto Rico y las Islas Vírgenes, en conjunto con otros datos de varamientos para el Caribe, proveen información importante sobre el historial de vida de estos cetáceos pelágicos, incluyendo sus hábitos alimenticios, parasitología, zoogeografía y amenazas a su supervivencia.

### INTRODUCTION

The pygmy and dwarf sperm whales (*Kogia breviceps* and *K. simus*) were described by Henry Marie Ducrotay de Blainville in 1838 and Sir Richard Owen in 1866, respectively. These closely related and morphologically similar species, which occur in pelagic waters of all tropical and temperate oceans, are commonly confused by scientists and wildlife officers (Caldwell and Caldwell, 1989). It was not until Handley's (1966) descriptions that a clear differentiation between the two species was established and resolved the identification confusion of previous records. Even though they are one of the most commonly stranded cetaceans in some parts of the world, both species are considered rare,

mainly because of their offshore distribution. Most of the information available on both species is based on stranded individuals, or ones occasionally taken in small fisheries (e.g. Jefferson et al., 1993). There is no information regarding the status of *Kogia* spp. in the Caribbean, even though occasional reports have been presented for different areas. We document new records of both pygmy and dwarf sperm whales for Puerto Rico and the Virgin Islands, and review the status of *Kogia* in the Caribbean.

### METHODS

Pygmy and dwarf sperm whale carcasses were collected as part of a study by the Caribbean Stranding Network to document and analyze marine mammal strandings

and mortality in Puerto Rico and the Virgin Islands (Mignucci-Giannoni, 1996). Alpha-level information and more detailed data was gathered opportunistically. Necropsies following standard protocol (Jefferson et al., 1994) were carried out in freshly-dead and moderately decomposed animals to determine cause of death and to obtain life history data (morphometrics, age, diet, and associated parasitic fauna). Available information and data from the Caribbean (published and unpublished) of stranding and capture records, were gathered by literature search, interviews, and necropsy reports of salvaged specimens. Other sources of information included the Southeastern United States (US) Marine Mammal Stranding Network database (Odell and Reynolds, 1991), the Caribbean Stranding Network database (Mignucci-Giannoni, 1996), and the Smithsonian Institution's historical cetacean record database (Mead, 1975).

#### RESULTS

Thirteen stranding records of *Kogia* spp. were gathered for Puerto Rico and the Virgin Islands between 1976 and 1998 (Table 1). Nine were of the pygmy sperm whale and four were of the dwarf sperm whale.

##### *Kogia breviceps* (de Blainville)

The first recorded stranding of a pygmy sperm whale occurred on 28 January 1976 in Puerto Rico, when a 315-cm adult male was found on shore in Guanajibo (18°13'N, 67°09'W), between Cabo Rojo and Mayagüez (Table 1, Fig. 1). The animal was examined by D. S. Erdman (Department of Natural Resources' Fisheries Laboratory). A large wound behind the right eye was documented, in addition to other cuts throughout the body, the latter probably caused by the stranding process. Complete morphometrics were taken, including weight (680 kg). The stomach had small squid beaks, remains of several bright red shrimps, and two small fish (related to deep-water searobins, Family Triglidae, possibly from the Genus *Peristedion*, D. S. Erdman, pers. comm.). Thousands of small

white parasitic worms were found in the stomach in addition to the presence of plastic in the digestive tract. Death was apparently due to accidental capture.

On 18 December 1977, a specimen stranded at Parque Colón in Barrio Espinal (18°27'N, 67°10'W), Aguada, Puerto Rico. The 305-cm animal was found alive by a local fisherman, and it presented numerous lacerations throughout the body. Although external and internal examinations were conducted, no cause of death was determined (A. Mejías, National Marine Fisheries Service, and C. Cuttress, University of Puerto Rico, pers. comm.). A third *K. breviceps* specimen was found dead on 1 January 1979 at sector El Seco (18°11.9'N, 67°7.2'W) in Mayagüez. The whale, a 320-cm male, was found floating on shore. An internal examination was conducted (A. Mejias, pers. comm.) but cause of death was not determined.

The first record of this species for the Virgin Islands occurred on 19 April 1987 at Tague Bay Reef (17°45'N, 64°35'W), St. Croix, when a 337-cm specimen was found stranded on shore (J. Odgen, pers. comm.). No cause of death was established. On 12 January 1988, a 337-cm male pygmy sperm whale stranded at Salt River, Columbus Landing (17°47'N, 64°45.5'W), also in St. Croix. The animal had a broken mandible teeth severed at the gum line, and the corner of the jaw ripped open, suggesting a death related to fishing.

Similar to the case in St. Croix, another pygmy sperm whale was accidentally caught by sport fishermen during a tournament off La Parguera, Puerto Rico, on 28 May 1989. The 237-cm male specimen was found at Punta Pitahaya (17°57'N, 67°08'W), Cabo Rojo. The mandible was removed with a sharp laceration and the flukes neatly cut. The stomach contained the deep-water mysid *Gnathophausia ingens* Dohrn, a bright-red shrimp. The skeletal remains were deposited at the University of Puerto Rico Marine Mammal Osteological Collection, Biology Museum (Mignucci-Giannoni et al., 1997).

Another *K. breviceps*, a 250-cm male, stranded on 30 October 1991 in the Gallows Bay side of Christianed Harbor (17°44'N,

TABLE 1. Stranding and capture records of *Kogia* spp. for the Caribbean.

Catalog no.	Date		Locality	No. Animals	Sex <sup>1</sup>	Size (cm)	Reference
<i>Kogia breviceps</i>							
- <sup>2</sup>		>1945	Bahía Nuevas Grandes, Cuba	1	U	- <sup>2</sup>	Leon and Aguayo, 1945; Aguayo, 1954
MHNICN5472	-- Sep	1973	Acandí, Golfo de Uraba, Chocó, Colombia	1	U	- <sup>2</sup>	Cuervo-Díaz et al., 1986
NEPST033	28 Jan	1976	Guanajibo, Mayagüez, Puerto Rico	1	M	315	Present paper
NEPST034	18 Dec	1977	Parque Colón, Barrio Espinal, Aguada, Puerto Rico	1	U	305	Present paper
NEPST035	01 Jan	1979	Sector El Seco, Mayagüez, Puerto Rico	1	M	320	Present paper
MVO5636	29 Oct	1983	Cartagena, Bolívar, Colombia	1	U	340	Prieto-Rodríguez, 1989
NEPST037	19 Apr	1987	Tague Bay Reef, St. Croix, US Virgin Islands	1	U	337	Present paper
NEPST147	10 Jan	1988	Salt River, Colombus Landing, St. Croix, US Virgin Islands	1	M	337	Present paper
NEPST135	25 Nov	1988	Golfo Morrosquillo, Berrugas, Sucre, Colombia	1	M	- <sup>2</sup>	Vidal, 1990
NEPST108	28 May	1989	Near Punta Pitahaya, Cabo Rojo, Puerto Rico	1	M	237	Present paper
06	-- --	1990	Sian Ka'an, México	1	U	- <sup>2</sup>	Ortega-Argueta et al., 1998
NEPST260	07 Feb	1990	Santa Marta, Magdalena, Colombia	1	U	- <sup>2</sup>	Muñoz-Hincapié et al., 1998
NEPST174	30 Oct	1991	Gallows Bay, St. Croix, US Virgin Islands	1	M	250	Present paper
NEPST200	25 Aug	1992	Playa Las Mujeres, Isla de Mona, Puerto Rico	1	U	- <sup>2</sup>	Present paper
07	28 Jun	1996	Cozumel, México	1	M	158	Ortega-Argueta et al., 1998
08	30 Jun	1996	Cozumel, México	1	U	- <sup>2</sup>	Ortega-Argueta et al., 1998
NEPST527	06 May	1997	Sector La Boca, Barceloneta, Puerto Rico	1	F	281	Present paper
09	27 Sep	1997	Cancún, México	1	M	338	Ortega-Argueta et al., 1998
<i>Kogia simus</i>							
UFO187089	-- Sep	1971	Saint Vincent, Saint Vincent and the Grenadines	2	U	- <sup>2</sup>	Caldwell and Caldwell, 1973
UFO18710	30 Jun	1977	Saint Vincent, Saint Vincent and the Grenadines	1	F	206	Caldwell and Caldwell, 1973

<sup>1</sup>U = undetermined, M = male, F = female.<sup>2</sup>Not assigned or data not available.

TABLE 1. (Continued) Stranding and capture records of *Kogia* spp. for the Caribbean.

Catalog no.	Date	Locality	No. Animals	Sex <sup>1</sup>	Size (cm)	Reference
<i>Kogia simus</i>						
AMA22.212	23 May	Lago Refinery, Aruba, Netherlands Antilles	1	U	- <sup>2</sup>	Debrot et al., 1998
- <sup>2</sup>	-- Dec	Klein Curaçao, Netherlands Antilles	1	U	110	Debrot and Barros, 1992
NEPST288	25 Oct	Cayo Icacos, La Cordillera, Fajardo, Puerto Rico	1	F	110	Present paper
NEPST487	29 Dec	Playa Piedra Redonda, Quebradillas, Puerto Rico	1	U	- <sup>2</sup>	Present paper
NEPST393	17 Jul	Playa El Maní, Mayagüez, Puerto Rico	1	M	223	Present paper
NEPST414	06 Aug	Punta del Viento, Patillas, Puerto Rico	1	F	244	Present paper
<i>Kogia</i> sp.						
28-4		Pedernales (Southwest), Dominican Republic	1	U	- <sup>2</sup>	Bonnely de Calventi, 1986
NEPST244	-- Jun	Santa Marta, Magdalena, Colombia	1	U	- <sup>2</sup>	Vidal, 1990
FC000113	27 Sep	Quintana Roo, México	1	U	- <sup>2</sup>	J. G. Mead pers. comm.

<sup>1</sup>U = undetermined, M = male, F = female.<sup>2</sup>Not assigned or data not available.

64°42'W), St. Croix. Death was due to a watercraft collision, since the whale's head (cranial from the eyes) had been cut-up with a large propeller that removed the skull and mandible, and left only skull fragments. Parts of the body showed severe and penetrating lacerations, that affected the chest cavity. The gastrointestinal tract contained *G. ingens* in the main stomach and ascaridoid nematodes (*Anisakis* sp., *A. physeteris* Baylis, *Terranova* sp., and *T. ceticola* Deardorff and Overstreet) in the stomach and liver (Mignucci-Giannoni et al., 1998).

On 25 August 1992, a badly decomposed pygmy sperm whale was found at Playa Las Mujeres (18°04'N, 67°56.45'W), between Carabineros and Punta Arena in Isla de Mona, Puerto Rico. The skeletal remains were deposited at the University of Puerto Rico Marine Mammal Osteological Collection (Mignucci-Giannoni et al., 1997). A tooth was sectioned to estimate age. Twelve growth layer groups (GLGs) were counted in the dentine and cementum. It is believed that one GLG is deposited annually. Cause of death was undetermined.

A 281-cm female specimen stranded at Sector La Boca (18°26'N, 66°32.3'W), in Barceloneta, Puerto Rico on 6 May 1997 (Fig. 2). Complete morphometrics and necropsy were conducted. The animal had a 58-cm male fetus. Death was most likely due to illness, since the heart was congested and had diffuse, minimal to mild edema. The acanthocephalan *Bolbosoma* sp. was collected from the intestines, and the cestode *Phyllobothrium delphini* (Bosc) was found imbedded in the whale's blubber (Mignucci-Giannoni et al., 1998). Ascaridoid and spirurid nematodes were also found, including *Anisakis* sp., *A. physeteris*, *Terranova* sp., and *T. ceticola* in the stomach, and *Crassicauda duguyi* Dollfus in the neck musculature. Skeletal remains were deposited at the Caribbean Stranding Network Marine Mammal Collection.

#### *Kogia simus* Owen

The first record of *Kogia simus* for the northeastern Caribbean was a 110-cm female dependent calf found on 25 October

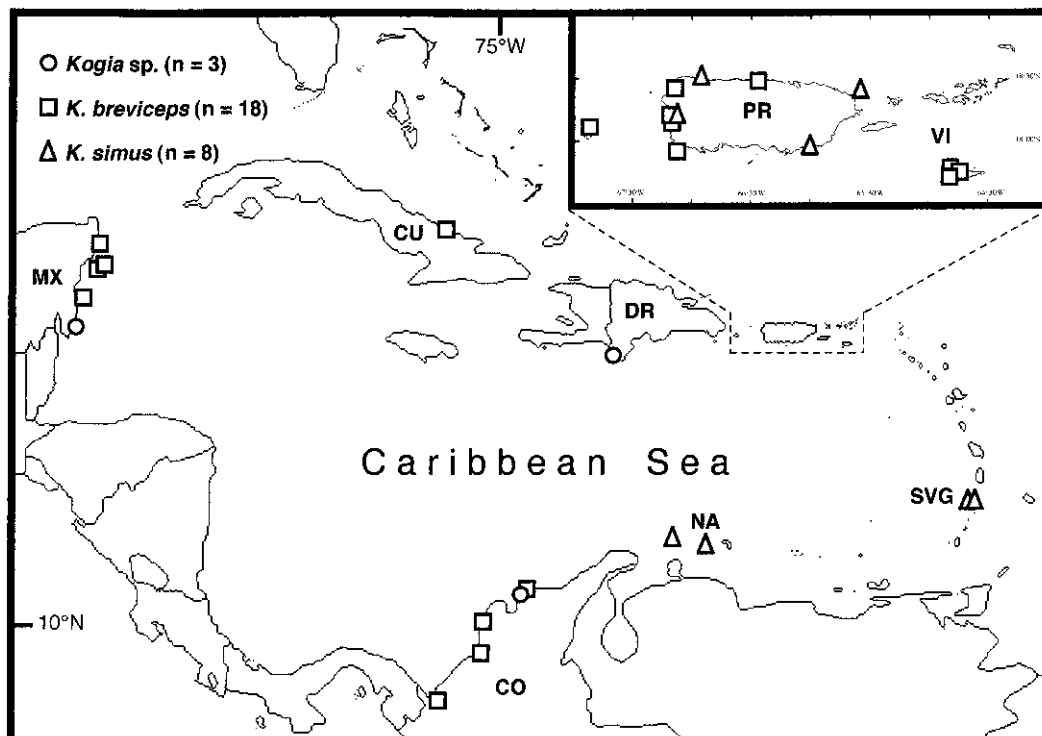


FIG. 1. Map of the Caribbean, illustrating records of *Kogia* spp. (CO = Colombia, CU = Cuba, DR = Dominican Republic, MX = Mexico, NA = Netherlands Antilles, PR = Puerto Rico, SVG = Saint Vincent and the Grenadines, VI = United States Virgin Islands, n = number of records, not specimens).

1993 stranded at Cayo Icacos, La Cordillera (18°23.3'N, 65°35.15'W), off Fajardo, Puerto Rico. Complete morphometrics were taken and a necropsy was conducted. Internal examination revealed two helminths: *Anisakis* sp. in the esophagus, and *Terranova* sp. in the stomach (Mignucci-Giannoni et al., 1998). Cause of death was not determined. On 29 December 1995, a second specimen of *K. simus* was found stranded at Playa Piedra Redonda (18°29'N, 67°57'W) in Quebradillas, Puerto Rico. The animal was photographed before its remains washed offshore.

A 223-cm male dwarf sperm whale stranded on 17 July 1998 at Playa El Maní (18°15.2'N, 67°10.4'W) in Mayagüez, on the west coast of Puerto Rico. The animal was found freshly dead and a necropsy was conducted, in addition to taking complete morphometrics. The animal's tail was entangled in a gillnet. The stomach con-

tained squid beaks and *G. ingens*. Nematodes were found in the stomach and esophagus, and cestodes were found in the blubber. The results of the histopathological analysis revealed congestion, edema and hemorrhage in the lungs, kidneys, spleen, and heart. The testicles were found with aspermia, indicating the immature status of the animal. Ulcerations were visible in the mucosa of the stomach. These lesions are nonspecific, but they correlate with cardiopulmonary insufficiency and irreversible shock probably due to entanglement in a fishing net. The skeletal remains were deposited in the Caribbean Stranding Network Marine Mammal Collection.

On 4 August 1998, a 244-cm female stranded at Punta del Viento (17°58.2'N, 65°58.5'W) in Patillas, Puerto Rico. The animal was examined on 6 August, while in a moderate state of decomposition. It had



FIG. 2. *Kogia breviceps* stranded in Sector Boca, Barceloneta, Puerto Rico on 6 May 1997. Notice the characteristic pointed snout, underslung jaw and white false-gill marking cranial to the flipper.

mutilations in the mouth and the right mandible was fractured. Some scavenger damage was present on the dorsal surface. The animal had a 56-cm female fetus. Fishing interaction is suspected as the predominant cause of death.

#### DISCUSSION

Pygmy and dwarf sperm whales have been considered rare throughout their range, but studies documenting the presence of *Kogia* spp., especially in the southeastern US (Odell and Reynolds, 1991), southern Africa (Ross, 1979, 1984), Canada (Baird et al., 1996; Willis and Baird, 1998) and South America (Muñoz-Hincapié et al., 1998), have demonstrated the contrary. The 13 records presented herein for Puerto Rico and the Virgin Islands continue to support that these species are common in the Atlantic Ocean.

*Kogia* spp. are well represented in the different areas of the Caribbean basin (Table 1, Fig. 1). Considering all *Kogia* records for the

Caribbean, both species have been reported throughout the year (Fig. 3). This occurrence implies residency of *Kogia* in the Caribbean. Gaps in the records along the coast of Central America between Panama and Belize, and in other Caribbean islands (Fig. 1) probably reflects a lack of cetacean biologists in the area rather than an actual gap in distribution. Furthermore, no sightings at sea

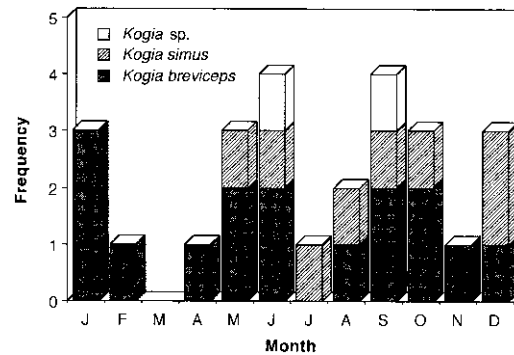


FIG. 3. Seasonality of *Kogia* spp. in the Caribbean.

have been reported in spite of some search effort (e.g. Jefferson and Lynn, 1994; Palacios et al., 1996), but additional shipboard or aerial surveys in conjunction with continued monitoring of stranding events should yield additional records and much needed information of the distribution, abundance, and habitats of *Kogia* in the Caribbean Sea.

Morphometric data for both whales correlates with that reviewed by Baird et al. (1996) and Willis and Baird (1998). The finding of two 110-cm dwarf sperm whale calves, and pregnant females of both pygmy (281 cm) and dwarf (244 cm) sperm whales, indicates that the area is used for breeding and calving. The diet of *Kogia* spp. consist of cephalopods, crabs, prawns, fish (Nature Conservancy Council, 1980), but mainly octopus and squid (Minasian et al., 1984). Stomach content from stranded specimens in Puerto Rico and the Virgin Islands included small squid beaks, the giant lophogastrid mysid *Gnathophausia ingens*, and small fish probably related to the deep-water searobins from the genus *Peristedion* sp. *Gnathophausia* shrimp are common in the stomachs of Caribbean pelagic cetaceans, especially ziphiids (Debrot and Barros, 1992; Rosario-Delestre and Mignucci-Gianoni, 1998; Rosario-Delestre et al., 1999) and have been reported in the stomach of a *K. breviceps* washed ashore in southern Brazil (Secchi et al., 1994), suggesting that this deep water mysid may be an important prey for *Kogia*, at least in tropical areas.

Of the metazoan parasites that we report, *A. physeteris* was also found in a stranded *K. breviceps* in southern Brazil (E. R. Secchi, Museu Oceanográfico Eliézer de C. Rios, pers. comm.). While Robson (1984) attributed the stranding of single individuals to heavy infestations of parasites in the head and inner ear, other authors (e.g. Roest, 1970; Zam et al., 1971; Ross, 1979; and Caldwell and Caldwell, 1989) did not attribute to parasitism the direct cause of mortality. In the cases studied in Puerto Rico and the Virgin Islands the parasite load was relatively light.

Reported causes of death for both whales in other areas have included accidental captures (Leatherwood, 1985; Leatherwood and Reeves, 1989), attacks by killer whales (Jefferson et al., 1991), predation by sharks,

and ingestion of plastic debris (Ross, 1979; Tarpley and Marwitz, 1993). Records for both species in our area add watercraft collision ( $n = 1$ ) and fisheries interactions ( $n = 7$ ) to the list. Direct fishing had been reported in the area of St. Vincent Island, where the three animals were captured in the 1970s. The high incidence of fisheries interaction of these species in the Caribbean should be monitored to better protect and manage the local populations of the pygmy and dwarf sperm whales.

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