FIRST OSTEOLOGICAL RECORD OF THE DWARF SPERM WHALE IN COLOMBIA, WITH NOTES ON THE ZOOGEOGRAPHY OF *KOGIA* IN SOUTH AMERICA

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Milton F. Muñoz-Hincapié[1], Diana M. Mora-Pinto[1], Daniel M. Palacios[2], Eduardo R. Secchi[3] & Antonio A. Mignucci-Giannoni[4]

Resumen

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Los cachalotes enano y pigmeo (*Kogia* spp.) se distribuyen generalmente en aguas pelágicas tropicales y templadas de todos los océanos; para Sur América la información es muy dispersa. Este primer informe osteológico del cachalote enano (*K. simus*) en Colombia, incluye la revisión de registros previos para Sur América. El especimen de Colombia es el sexto caso para la costa del Pacífico suramericano y la primera evidencia osteológica de la especie en Colombia. La información biológica sobre las dos especies en Sur América se ha incrementado en los últimos años. Un total de 21 casos de *K. breviceps*, 23 de *K. simus* y 5 de *Kogia* sp. fueron estudiados para el análisis zoogeográfico de las especies. Estas especies son comunes en la mayoría de los

1 Biologists, Universidad Nacional de Colombia, AA 72773 Santafé de Bogotá, Colombia; Present address: Departamento de Ciencias Marinas, Universidad de Puerto Rico, PO Box 908, Lajas, Puerto Rico 00667; milton_fmh@hotmail.com and diana_mora@hotmail.com.

2 Oceanographer, College of Oceanic and Atmospheric Sciences, Oregon State University, 104 Oceanography Administration Building, Corvallis, Oregon 97331-5503; dpalacio@oce.orst.edu.

3 Oceanographer, Laboratorio de Mamíferos Marinhos, Museu Oceanográfico "Prof. Eliézer de C. Rios". Caixa Postal 379, Rio Grande, RS, 96200-970 Brasil; musmamif@super.furg.br.

4 Biological Oceanographer and Associate Professor, Red Caribeña de Varamientos • Caribbean Stranding Network & Departamento de Ciencias y Tecnología, Universidad Metropolitana, SUAGM, PO Box 361715 San Juan, Puerto Rico 00936-1715; mignucci@caribe.net.

paises con costas en el Caribe, Atlántico y Pacífico, pero Uruguay, raras en Argentina y Chile. No existen registros para Venezuela, Trinidad, Guyana, Surinam y Guayana Francesa. La mayor parte de los casos corresponden a aguas tropicales al norte del Trópico de Capricornio (23.5°S); las diferencias en la distribución entre las latitudes de los informes en las costas occidental y oriental, probablemente están relacionadas con las corrientes y masas de agua prevalentes. La distribución de las especies de *Kogia* parece estar ligada a las masas de aguas cálidas, y caracterizada como pelágico-tropical, alcanzando 15°S en la costa del Pacífico y hasta 33°S en la costa del Atlántico.

Palabras claves: Cetacea, *Kogia breviceps*, *K. simus*, zoogeografía, varamientos, Colombia, Sur América.

Abstract

The dwarf and pygmy sperm whale (*Kogia* spp.) are known to occur in pelagic waters of all tropical and temperate oceans, but their record in South America is fragmentary. We reviewed the literature for records of both species in South America as part of documenting the first osteological record of the dwarf sperm whale (*K. simus*) in Colombia. The new Colombian specimen is only the sixth recorded so far from the Pacific coast of mainland South America, and the first osteological voucher of the species for Colombia. The biological information of the two species in South America has increased in recent years as a result of increased presence of researchers in the region. A total of 21 records of *K. breviceps*, 23 of *K. simus* and 5 of *Kogia* sp. were studied, to analyze the species' zoogeography. Both whale species were found in most coastal nations of the Caribbean, Atlantic and Pacific, but appear to be rare in Uruguay, Argentina and Chile. No records exist for Venezuela, Trinidad, Guyana, Suriname, and French Guiana. Most of the records were in waters north of the Tropic of Capricorn (23.5°S); differences in tropical distribution observed when comparing the latitudes of records from the east coast with the west coast are probably related to the prevailing currents and water masses. The distribution of both species of *Kogia* appears to be tied to the warmer water masses, and characterized as tropical pelagic, ranging as far south as 15°S on the Pacific coast and 33°S on the Atlantic coast.

Key words: Cetacea, *Kogia breviceps*, *K. simus*, zoogeography, strandings, Colombia, South America.

Introduction

The dwarf sperm whale (*Kogia simus*) and pygmy sperm whale (*Kogia breviceps*) are odontocetes known to occur in all tropical and temperate oceans of the world, particularly offshore (**Handley**, 1966; **Caldwell & Caldwell**,1989; **Jefferson** et al. 1993). These shy and undemonstrative whales are rarely detected at sea, except under excellent sighting conditions, and specific separation is often difficult during the typically brief encounters. On the other hand, they are one of the most commonly stranded cetaceans in several parts of the world, and indeed most of the information available is based on beached individuals or ones occasionally taken in small fisheries (e.g. **Jefferson** et al., 1993). However, their zoogeography, basic biology, life history and behavior remain poorly understood.

Information on the distribution of the genus *Kogia* for the South American continent has been extremely scarce. The most recent revision (**Caldwell & Caldwell**, 1989) only included two records of *K. breviceps* and two of *K. simus* for this part of the world. Since then, the number of documented reports has significantly increased to 49, but unfortunately, this information has not always been part of the mainstream scientific literature. Thus we consider it of value to include a review of reports of both pygmy and dwarf sperm whales in South America as part of documenting the first osteological record of the dwarf sperm whale in Colombia.

Colombia's first osteological record of *Kogia simus*

On 20 September 1993, a dwarf sperm whale stranded on a sandy beach between the communities of La Vigia and Mulatos (02°39'N, 78°22'W), on the Pacific coast of Colombia. Despite its advanced state of decomposi-

tion, four days later, initial identification of the animal was made based on the remnant of its false-gill coloration behind the head, the generic characteristic underslung jaw, and the height, shape and location of its dorsal fin. The diagnostic skull characteristics, as detailed in **Handley** (1966), **Ross** (1979) and **Caldwell & Caldwell** (1989), further confirmed the identification.

The complete skeleton was salvaged and examined. The skull measured 238 mm in condylobasal length (CBL) (Table 1). Each ramus of the lower jaw had 9 alveoli. A total of 7 teeth were collected from both rami. Tooth analysis, as in **Hohn** (1980), indicated an estimated age of 8 growth layer groups (GLGs). The lack of fusion of cranial sutures, vertebrae and intervertebral discs indicated that this specimen was physically immature. The CBL was below the range given by **Ross** (1979) of 265-275 mm of CBL, in which both females and males seem to reach physical maturity. The rostrum length/CBL ratio of this specimen (44.5%), however, was higher than the range established by **Ross** (1979) for *K. simus* in South African waters of 28.5-41.4%. This finding is in agreement with the observation by **Félix** et al. (1995) that the rostrum of South America specimens appears to be longer and more variable that in the South African specimens (Table 2).

The specimen reported here is only the sixth recorded so far from the Pacific coast of mainland South America, and the first voucher specimen of the species for Colombia.

Review of records of *Kogia* spp. in South America

The South American continent is surrounded by three major ocean realms: the Caribbean Sea to the north, the Atlantic Ocean to the east, and the Pacific Ocean to the

Table 1. Cranial and mandibular measurements of a dwarf sperm whale (*Kogia simus*) from Colombia following the methodology by Ross (1979).

Measurements		mm	Percent of Measurement No. 1
1	Total (condylobasal) length	238.0	100.0
2	Rostrum length	106.0	44.5
3	Rostrum, basal width	113.5	47.7
4	Rostrum width at its middle	73.0	30.7
5	Breadth across pre-orbital angles of supraorbital process	192.0	80.7
6	Breadth across post-orbital process	216.0	90.7
7	Zygomaytic width	213.0	89.6
8	Height of vertex	163.0	68.5
9	Width of vertex	16.0	6.7
10	Width of supra-occipital at narrowest part between posterior margins of temporal fossae	165.0	69.3
11	Tip rostrum left naris	96.7	40.6
12	Height of ventral border of foramen magnum	46.6	19.5
13	Length maxillary toothgroove left	42.0	17.6
14	Length maxillary toothgroove right	40.0	16.8
15	Width outer margins occipital condyles	70.0	29.4
16	Tip rostrum hind margins pterigoids	120.0	50.4
17	Length of mandible left	191.0	80.2
18	Number of alveoli left	9	-
19	Number of alveoli right	9	-
20	Height mandible at coronoid	58.0	24.3
21	Length mandibular symphisis	32.0	13.4
22	Length lower toothrow left	69.0	28.9
23	Length lower toothrow right	69.0	28.9
24	Height dorsal border of foramen magnum to vertex	107.5	45.1

Table 2. Relationship between condylobasal length and rostrum length of dwarf sperm whales (*Kogia simus*) from South America following the methodology by **Ross** (1979).

Country	Percent of rostrum length	Reference
Brasil	43.4	**Pinedo** (1987)
Chile	51.9	**Crovetto & Toro** (1983)
Colombia	44.5	This paper
Ecuador	38.2	**Félix** et al. (1995)
Perú	46.0	**Reyes & Van Waerebeek** (1992)

west. Given the particular oceanographic characteristics of each one of these basins, we consider the records of *Kogia* spp. for each region separately in the review that follows. The records are listed in Table 3 and their distribution is shown in Figure 1.

Caribbean Sea. Three surveys have been conducted in the southwestern Caribbean, including waters of Colombia (**Jefferson & Lynn**, 1994; **Palacios** et al., 1995; **Palacios** et al., 1996a), but no sightings of either species were recorded. The presence of *K. breviceps* in the Colombian Caribbean is known from three strandings and one incidental capture in fishing operations. A live animal stranded in Cartagena, Bolívar, on 29 October 1983 (**Prieto-Rodríguez**, 1989). Its skull is now housed at the Museo Venado de Oro in Bogotá. A second specimen stranded in Santa Marta, Magdalena, on 7 February 1990 (N.H. Campos, pers. comm.). A third pygmy sperm whale became entangled in artesanal fishing gear in the Gulf of Morrosquillo near Berrugas, Sucre, on 25 November 1988 (**Vidal**, 1990). The complete skeleton is housed at the Centro de Investigación, Educación y Recreación in Islas del Rosario (C.A. Bohorquez, pers. comm.).

Cuervo et al. (1986) and **Vidal** (1990) reported the stranding of a dwarf sperm whale in September 1973 in the Gulf of Uraba, near Acandí, Chocó. This identification, however, is incorrect. A careful examination by MFMH and DMMP in 1992 of the skull of this specimen, now housed at the mammalogy collection of the Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá, showed that it was in fact a specimen of *K. breviceps*, based on its morphology and size. It is thus the fourth record of the pygmy sperm whale for the Caribbean coast of Colombia. One additional stranding, identified only as *Kogia* sp., was reported from Santa Marta in June 1986 (**Vidal**, 1990; M. Prieto-Rodriguez, pers. comm.).

Debrot & Barros (1992) reported the stranding of a *K. simus* stranded in Klein Curaçao in December 1989. No records of *Kogia* spp. have been reported for Trinidad and Venezuela (**Romero** et al., 1991).

Atlantic Ocean. Information on the presence of the *Kogia* along the east coast of South America consists of 16 strandings, three captures, and one instance of entanglement (Table 3, Figure 1). No records of either species have been reported off the countries along the western equatorial Atlantic (Guyana, Suriname, or French Guiana).

In Brasil there is information on seven pygmy sperm whale strandings and one capture. A pregnant female (with a 26 cm fetus) stranded at Praia José Menino, in Santos (São Paulo) on October 1965 (**Carvalho**, 1966). The specimen is housed at the collection of the Departamento de Zoologia, Secretaria de Agricultura. **Geise & Borobia** (1987) documented the stranding of a female on Arraial do Cabo, in Cabo Frio, Rio de Janeiro in December 1983. Its skeletal remains, including the skull are housed at the Museu de Zoologia of the Universidade de São Paulo. A subadult pygmy sperm whale was described by **Rosas & Pinedo** (1989) from a stranding at Praia do Cassino in Rio Grande, Rio Grande do Sul on September 1986. Its skull, housed at the Colección del Museu Oceanográfico de Rio Grande, had bullet perforations in the eyes and vomer. The authors implicated this as the obvious cause of its death. A male pygmy sperm whale, was found dead in May 1987 at Praia da Cacimba do Padre on Ilha de Fernando de Noronha (L. Lodi and S. Siciliano, unpubl. data). A 288-cm adult female stranded on 15 January 1988 at Praia do Marujá, in Cananéia (São Paulo) (**Schmiegelow**, 1990). An adult specimen was also reported stranded at Tramandaí, Rio Grande do Sul on 29 September 1988 (GERMARS, unpubl. data). Two females, an adult and a subadult, stranded on 1 May 1989 at Praia do Mar Grosso, in São José do Norte (Rio Grande do Sul) (**Secchi** et al., 1994); the skull of the adult is housed at the collection of the Museu Oceanográfico "Prof. Eliézer de C. Rios". The most recent *K. breviceps* stranding in Brasil occurred on 21 October 1997, when an animal was found on Praia de Lucena in Rio Tinto (Paraíba) (A. Pereira and D. Peludo pers. comm.).

The dwarf sperm whale has been recorded nine times in Brasil. A pregnant female stranded in July 1983 at Praia do Mar Grosso (**Pinedo**, 1987). A neonate female stranded

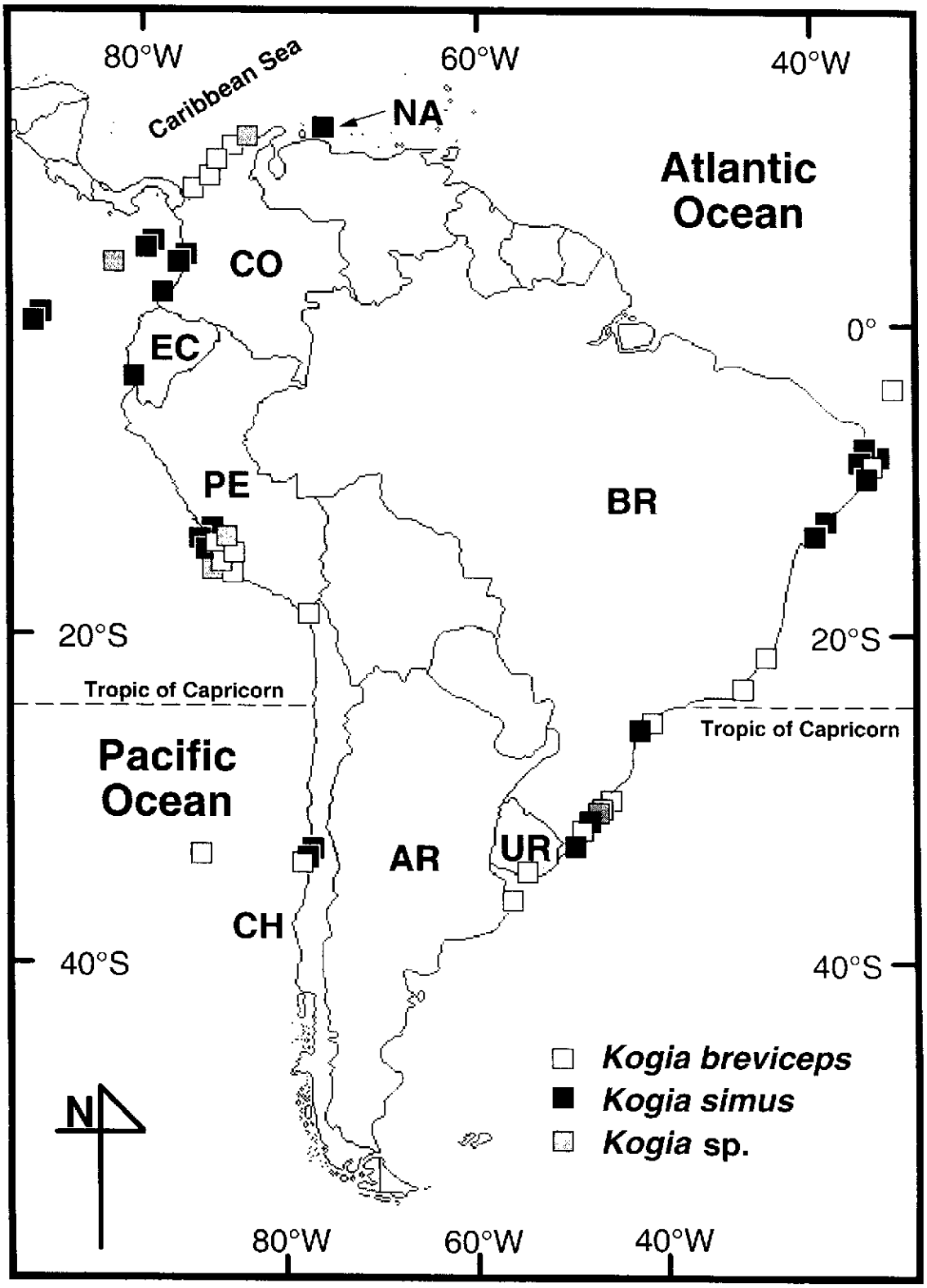

Figure 1. Distribution of *Kogia* spp. in South America based on sighting, stranding and capture data (AR = Argentina, BR = Brasil, CH = Chile, CO = Colombia, EC = Ecuador, NA = Netherland Antilles, PE = Perú, UR = Uruguay).

on 17 January 1990 at the mouth of Rio Imbasaí in Santo Antônio, 15 km N of Praia do Forte in Itaparica (Bahia) (**Hetzel & Lodi**, 1993). A third specimen stranded at Praia das Monções in Paraná on 25 April 1994 (**Zanelatto & Guiera**, 1994; **Zanelatto** et al. 1996). On 3 June 1994, a *K. simus* stranded at Praia da Penha in João Pessoa (Paraíba) and another stranded on 13 January 1995 at Praia do Cabo Branco, also in João Pressoa (**Pereira** et al., 1998). Their skeletal remains were collected and are housed at the Universidade Federal da Paraíba. Local fishermen of Vila de Massarandupió in Entre Rios (Bahia) reported capturing a dwarf sperm whale early in June 1995 (**Sampaio** et al., 1996). The bones left by the fishermen after consumption of the animal's meat, were collected and are deposited in the collection of the Grupo de Estudos de Cetáceos da Bahia. Another specimen stranded on 24 January 1996 in Barra do Mamanguape, Rio Tinto (Paraíba), and its skeletal remains are housed at the Universidade Federal da Paraíba (**Pereira** et al., 1998). **Soto** et al. (1996) reported the incidental capture of *K. simus* in surface gillnets operated by the fishing fleet from Itajaí in Santa Catarina, Rio Grande do Sul. A 200-cm dwarf sperm whale was captured with a gillnet off Praia de Pitimbú in Paraíba on 7 June 1997 (**Marques** et al., 1998). Upon landing on port, the meat of the animal was consumed by locals. One stranding of *Kogia* sp, was recently recorded near Capão da Canoa in Rio Grande do Sul in April 1997 (GEMARS, unpubl. data).

The only record of *Kogia* in Uruguay was reported by **Vaz Ferreira & Praderi** (1973). They described the live-stranding of a 195-kg male pygmy sperm whale in April 1971 at Playa Ramírez, in Montevideo. The animal was rescued and taken to the Jardín Zoológico de Villa Dolores, but the animal died on the same night. The skeletal remains of the specimen are now housed at the Museo Nacional de Historia Natural.

In Argentina, a female pygmy sperm whale stranded in October 1981 at Playas de Palo Blanco, San Clemente del Tuyú, between Buenos Aires and Mar del Plata (**Castello** et al., 1986). D. Rodríguez (pers. comm.) reported to us that four more unpublished records of *K. breviceps* recently were documented in Argentina.

Pacific Ocean. Collectively, over 22 sightings, strandings, and incidents of mortality in fishing operations have been documented for the genus *Kogia* from the four countries along the west coast of South America (Table 3, Figure 1).

Vidal (1990) compiled sighting information in Colombian waters through 1987 from survey cruises conducted by the U.S. National Marine Fisheries Service (NMFS), and from sightings made on board tuna vessels. There were three sightings of dwarf sperm whales: 75 km W of Bahia Malaga, and 10 km W of Cabo Corrientes, both on 31 October 1986, and one animal sighted near Malpelo Island in 1987. Two additional sightings have been made since: one of a single animal reported as *Kogia* sp. 230 km WSW of Malpelo Island on 9 October 1989, and one dwarf sperm whale 225 km W of Cabo Corrientes on 6 October 1992 (**Gerrodette & Palacios**, 1996). Previous to the osteological specimen reported here, no strandings had been recorded on the Pacific coast of Colombia.

No sightings of either species of *Kogia* were reported in Ecuadorian waters from the NMFS cruises between 1986 and 1993 (**Gerrodette & Palacios**, 1996). **Day** (1994) considered that both dwarf and pygmy sperm whales could be seen in waters around the Galápagos Islands. **Palacios** et al. (1996b), however, argued that it is more likely that only dwarf sperm whales are normally present there. For the mainland, **Félix** et al. (1995) reported the incidental capture of two dwarf sperm whales on 12 May 1993 in artisanal gillnets, 56 km SW of Anconcito. The head of one of the animals, an adult male, was collected and its skull was deposited in the reference collection of the Fundación Ecuatoriana para el Estudio de Mamíferos Marinos. **Félix** et al. (1995) also reported the stranding of a dwarf sperm whale on Quinta Playa, Isabela Island, Galápagos, in March 1990. The skull and skeleton are deposited in the Laboratorio de Taxidermia, Facultad de Ciencias Naturales at the Universidad de Guayaquil. An additional skull of a dwarf sperm whale found on the northern shore of Santa Cruz Island is in the personal collection of G. Angermeyer in Puerto Ayora, Santa Cruz Island, Galápagos (**Palacios**, 1995).

The first record of *Kogia* for Perú is of a skull of a pygmy sperm whale from Bahía de la Independencia, south of Pisco, collected by R.C. Murphy in November 1919 (**Van Waerebeek** et al., 1987). This skull is housed at the Museum of Comparative Zoology in Cambridge, Massachusetts (**Van Waerebeek** et al., 1987; **Reyes** et al., 1988), and its specific identity has yet to be confirmed as *K. simus* was not recognized as a separate species from *K. breviceps* until 1966 (see **Handley**, 1966). **Van Waerebeek** et al. (1987) reported finding the skull and other skeletal remains of a second *K. breviceps* in a trash dump in the port of Pucusana. The specimen was found in December 1984 and is believed to have been captured in the fisheries for small cetaceans run by locals (**Van Waerebeek** et al., 1987). A third pygmy sperm

whale stranded at Bahía de Paracas in January 1987 (**Reyes** et al., 1988). The specimen, a pregnant female, had a fetus of approximately 92.5 cm in length. Another female stranded at the same locality on 10 July 1988. The animal's skeletal remains were collected for the Centro Peruano de Estudios Cetológicos (CEPEC).

The first record of *Kogia simus* for Perú is of a female with a fetus, found in a fishing trash dump in Lagunillas, Paracas, in November 1985 (**Reyes** et al., 1988). The skull was collected for the CEPEC. **Reyes** et al. (1988) reported the live-stranding of an adult female and a calf dwarf sperm whales on August 1986 in the Bahía de Paracas. They also reported the entanglement in a shark net of an adult male dwarf sperm whale in Pucusana, in January 1988 (**Reyes** et al., 1988; **Reyes**, 1992). Two records of *Kogia* unidentified to species level were also reported for Perú, one between April and May 1987 in the port of Pucusana, and one of a pregnant female (with a 84-cm fetus) found stranded in December 1990 in Bahía de Paracas. K. Van Waerebeek (pers. comm.) reported to us that several more unpublished records of *Kogia* exist for Perú.

In Chile, **Toro** (1965), **Crovetto** & **Toro** (1983) and **Nagorsen** (1985) reported a young female *K. simus* captured by fishermen in Caleta Portales, Valparaiso on 2 December 1960, and a *K. breviceps* stranded in July 1969, 15 km from the beach between Arica, Tarapaca, and the Peruvian border (J. G. Mead & MMEP, Smithsonian Institution, unpubl. data). Another stranding of *K. breviceps* was reported on 8 November 1968 at Caleta Caravahel, Juan Fernández Islands (J. G. Mead & MMEP, Smithsonian Institution, unpubl. data). On 1 April 1995, an adult pygmy sperm whale was reported stranded in Rocas de Santo Domingo (**Sanino** & **Yañez**, 1996). The most recent stranding was of a pregnant female of *K. simus* which stranded alive in Playa Maitenlahue, San Antonio on 2 February 1996 (**Brito**, 1996). The 120-kg animal was pushed back by fishermen, but re-stranded and died.

Zoogeography of *Kogia* in South America

The biological information of the genus *Kogia* in South America has increased in recent years as a result of increased presence of researchers in the region. Equally, our knowledge of its distribution is still largely restricted to specimens collected on beaches or to animals captured by fishermen and brought ashore; in part, this distribution reflects that of the interested observers. Perhaps the only exception is in the most tropical waters of the Pacific Ocean, where considerable survey effort has been conducted resulting in some sightings of *K. simus*, mainly in Colombian waters.

Both pygmy and dwarf sperm whales were found in most coastal nations of the Caribbean, Atlantic and Pacific. The notable exceptions were Venezuela, Trinidad and Tobago, Guyana, Suriname and French Guiana, as well as the northern part of Brasil (from Cabo Caciporé to Cabo de São Roque). This is perhaps not surprising, considering that the Amazon and Orinoco Rivers discharge enormous amounts of fresh water and continental sediments to this region, possibly modifying the preferred habitats of *Kogia*. A lack of adequate observer effort in these countries could also help explain this gap in distribution. *Kogia* appears to be rare in Uruguay, Argentina and Chile.

The scanty records from the Caribbean, the most tropical of the regions in this study, appear to indicate that *K. breviceps* is more common there than *K. simus*. This may be an artifact of the small sample, however as both species are almost equally well represented in the stranding record for the Gulf of Mexico (**Jefferson** et al., 1992), to the northwest of our study area.

There was a similar number of records for pygmy and dwarf sperm whales along the Atlantic coast of South America, and they occurred in relatively close proximity to each other, nonetheless, and any suggestion of distributional differentiation or relative abundance of either of the species along this coast is premature until more studies are conducted.

The observed distribution of *Kogia* on the Pacific coast of South America from this study is in agreement with the existing knowledge of the zoogeography of the genus in the eastern North Pacific. Evidence there indicates that *K. breviceps* has a more "anti-tropical" (i.e. warm-temperate to cool-temperate) distribution while *K. simus* tends to occupy the warmer-temperate to tropical waters (**Leatherwood** et al., 1988; **Wade** & **Gerrodette**, 1993). Thus we should expect to find *K. breviceps* further south than *K. simus* in the eastern South Pacific, as the records for Perú and Chile appear to indicate. In fact, according to **Caldwell** & **Caldwell** (1989), the tendency for *K. simus* to occur more often in tropical waters should be expected throughout the world's oceans.

The oceanographic conditions off the east and west coasts of the South American continent are determined by important current systems that grant some discussion as they influence the distribution of *Kogia*. Using the Tropic

Table 3. Sighting, stranding and capture records of *Kogia* spp. for South America.

Catalog No.	Date	Locality*	No. Animals	Sex	Size	CBL	Reference
Kogia breviceps							
MCZ18489	Nov 1919	Bahia de la Independencia, S of Pisco, PE	1	U	-	317 mm	**Van Waerebeek** et al. 1987
DZ10597	Oct 1965	Praia José Menino, Santos, São Paulo, BR	1	F	280 cm	-	**Carvalho**, 1966
NMNH00395634	08 Nov 1968	Caleta Caravahel, Islas de Juan Fernández, CH	1	U	-	-	J. G. Mead, pers. comm.
NMNH00395734	Jul 1969	Between Peruvian border and Arica (Tarapaca), CH	1	U	-	-	J. G. Mead, pers. comm.
MNHN2431 1973	Apr 1971	Playa Ramírez, Montevideo, UR	1	M	220 cm	-	**Vaz Ferreira & Praderi**,
MHNICN5472 paper	Sep 1973	Acandí, Golfo de Uraba, Chocó, CO	1	U	-	-	**Cuervo** et al. 1986, this
-	-- Oct 1981	Playas de Palo Blanco, San Clemente del Tuyú, AR	1	F	308 cm	-	**Castello** et al., 1986
MVO5636	29 Oct 1983	Cartagena, Bolivar, CO	1	U	340 cm	267 mm	**Prieto-Rodriguez**, 1989
MZUSP19482	— Dec 1983	Arraial do Cabo, Cabo Frio, Rio de Janeiro, BR	1	F	253 cm	364 mm	**Geise & Borobia**, 1987
JCR037 1987	-- Dec 1984	Pucusana, PE	1	U	204 cm	294 mm	**Van Waerebeek** et al.,
MORG891	— Sep 1986	Praia do Cassino, Rio Grande do Sul, BR	1	U	200 cm	287 mm	**Rosas & Pinedo**, 1989
-	— Jan 1987	Bahía de Paracas, PE	1	F	>286 cm	470 mm	**Reyes** et al., 1988
-	— May 1987	Praia da Cacimba do Padre, Ilha de Fernando de Noronha, BR	1	M	273 cm	347 mm	Lodi & Siciliano unpubl. data
-	15 Jan 1988	Praia do Marujá, Cananéia, São Paulo, BR	1	F	288 cm	-	**Schmiegelow**, 1990
JCR1482	10 Jul 1988	Bahia de Paracas, PE	1	F	260 cm	410 mm	**Reyes** et al., 1988
-	29 Sep 1988	Tramandai, Rio Grande do Sul, BR	1	U	>300 cm	-	GEMARS. unpubl. data
comm.							
NEPST135	25 Nov 1988	Near Berrugas, Golfo Morrosquillo, Sucre, CO	1	U	-	-	**Vidal**, 1990
MORG2014	01 May 1989	Praia do Mar Grosso, Rio Grande do Sul, BR	2	F	323 cm	445 mm	**Secchi** et al., 1994
				F	224 cm	-	
NEPST260	07 Feb 1990	Santa Marta, Magdalena, CO	1	U	-	-	N. H. Campos, pers. comm.
-	01 Apr 1995	Rocas de Santo Domingo, CH	1	U	350 cm	-	**Sanino & Yañez**, 1996
-	21 Oct 1997	Praia de Lucena, Rio Tinto, Paraiba, BR	1	U	-	-	A. Pereira & D. Paludo pers. comm.
Kogia simus							
-	— - -	Northern shore of Isla Santa Cruz, Isla Galapagos, EC	1	U	-	-	**Palacios**, 1995
-	02 Dec 1960	Caleta Portales, Valparaiso, CH	1	F	-	-	**Toro**, 1965
-	— Jul 1983	Praia do Mar Grosso, Rio Grande do Sul, BR	1	F	249 cm	-	**Pinedo**, 1987

* AR = Argentina, BR = Brasil, CH = Chile, CO = Colombia, EC = Ecuador, NA = Netherland Antilles, PE = Perú, UR = Uruguay.

Table 3. Continued.

Catalog No.	Date	Locality*	No. Animals	Sex	Size	CBL	Reference
JCR646	— Nov 1985	Lagunillas, Paracas, PE	1	F	214 cm	267 mm	**Reyes** et al., 1988
-	— Aug 1986	Bahía de Paracas, PE	2	F	~223 cm	-	**Reyes** et al., 1988
				U	-	-	
-	31 Oct 1986	75 km W of Bahía Malaga, Valle, CO	1	U	-	-	**Gerrodette & Palacios,** 1996
-	31 Oct 1986	10 km W of Cabo Corrientes, Choco, CO	1	U	-	-	**Gerrodette & Palacios,** 1996
-	— —- 1987	Near Isla de Malpelo, CO	1	U	-	-	**Gerrodette & Palacios,** 1996
KVW1027	— Jan 1988	Pucusana, PE	1	M	132 cm	-	**Reyes**, 1992
-	— Dec 1989	Klein Curaçao, NA	1	U	110 cm	-	**Debrot & Barros**, 1992
-	17 Jan 1990	Mouth Rio Imbasaí, Santo Antônio, Itaparica, Bahia, BR	1	F	100 cm	-	**Hetzel & Lodi**, 1993
-	— Mar 1990	Quinta Playa, Isla Isabela, Islas Galapagos, EC	1	U	-	-	**Félix** et al., 1996
-	06 Oct 1992	225 km W of Cabo Corrientes, Choco, CO	1	U	-	-	**Gerrodette & Palacios,** 1996
FEMM01293	12 May 1993	56 km SW of Anconcito, EC	2	M	>200 cm	273 mm	**Félix** et al., 1995
				U	-	-	
-	20 Sep 1993	Between La Vigía and Mulatos, Nariño, CO	1	U	-	238 mm	This paper
	25 Apr 1994	Praia das Monções, Paraná, BR	1	U	242 cm	-	**Zanelatto & Guiera**, 1994
UFPB 2021	03 Jun 1994	Praia da Penha, João Pessoa, Paraíba, BR	1	U	-	261 mm	**Pereira** et al., 1998.
UFPB 2022	13 Jan 1995	Praia do Cabo Branco, João Pessoa, Paraíba, BR	1	M	-	269 mm	**Pereira** et al., 1998.
-	04 Jun 1995	Off Vila de Massarandupió, Entre Rios, Bahia, BR	1	U	-	-	**Sampaio** et al., 1996
UFPB 2405	24 Jan 1996	Barra do Mamanguape, Rio Tinto, Paraíba, BR	1	U	-	254 mm	**Pereira** et al., 1998.
-	02 Feb 1996	Playa de Maitenlahue, San Antonio, CH	1	F	226 cm	225 mm	**Brito**, 1996
-	07 Jun 1997	Off Praia de Pitimbu, Paraíba, BR	1	U	200 cm	252 mm	**Marques** et al., 1998
-	-	Rio Grande do Sul, BR	1	U	-	-	**Soto** et al., 1996
Kogia sp.							
NEPST244	— Jun 1986	Santa Marta, Magdalena, CO	1	U	-	-	**Vidal**, 1990
-	Apr 1987	Puerto Pucusana, PE	1	U	-	-	**Reyes** et al., 1988
-	09 Oct 1989	230 km WSW of Isla de Malpelo, CO	1	U	-	-	**Gerrodette & Palacios,** 1996
-	— Dec 1990	Bahía de Paracas, PE	1	F	-	-	K. Van Waerebeek, pers. comm.
-	Apr 1997	Near Capão da Canoa, Rio Grande do Sul, BR	1	U	-	-	GEMARS, unpubl. data.

of Capricorn (23.5°S) as a reference latitude which roughly separates tropical waters to the north from temperate waters to the south, it is evident that a large number of records occurred south of 23.5°S on the east coast while there were only a few south of this latitude on the west coast. The southward extension in the range of *Kogia* on the east coast is probably tied to the southward flow of the warm Brasilian Current, which can reach Uruguay and the northern portions of Argentina, particularly at its highest flow peak during the austral summer (**Gordon & Greengrove**, 1986). On the other hand, the more protracted range of *Kogia* on the west coast is probably linked to the cool, northward flow of the Perú Current. This prompted **Van Waerebeek** et al. (1987) to believe that *Kogia* is a casual visitor to Perú, perhaps coming in with temporal warm water intrusions, such as occurs during El Niño.

On the southern part of the west coast, only four records exist from central-Chile, which do not fit the observed tropical distribution of *Kogia*. These records occurred during the continent's austral summer, and could possibly be attributed to stray or lost animals which ended up stranded on shore. The same scenario may be true for pygmy sperm whales in Uruguay and Argentina. Contrary to the latter, and as a different explanation, these records may respond zoogeographically to a similar situation as off southern Africa, where both species of *Kogia* are recorded (G. J. B. Ross, pers. comm.). The oceanography of both coasts in the southern part of each continent is similar: The southeastern cost of South America exhibits mixed water between the warm Brazilian current and the cold Malvinas current, similar to the east cape of southern Africa, where the warm Agulhas current and the cold Benguela current mix. The same applies off the western coasts of South America and South Africa, were cold currents moving north are met by warm currents moving south. This mixing of warm and cold water currents, may provide *Kogia* with suitable habitat for feeding, and thus provide an explanation for records south of the Tropic of Capricorn.

In conclusion, this study indicates that both species of the genus *Kogia* are well represented around the South American continent. Our analysis suggests that the distribution of both species of *Kogia* is tied to the warmer water masses, and in some cases in areas where cold currents meet warm currents. Notwithstanding stranding cases, sightings have only been reported for *K. simus*, all offshore in pelagic waters. *Kogia*'s zoogeography in South America could be then summarized as tropical and warm-temperate pelagic, ranging as far south as 15°S on the Pacific coast and 33°S on the Atlantic coast.

Both species appear to strand with some frequency, and it cannot be discounted that, in addition to the documented catches, some of these strandings may be resulting from interactions with fisheries. Thus, management programs in these nations should consider adequate protection of both pygmy and dwarf sperm whales and their habitat. Finally, the urgent need for more systematic studies of the cetacean fauna in the diverse habitats of South America cannot be overemphasized.

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