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OCCURRENCE OF LEOPARD SEALS IN NORTHERN ARGENTINA

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The leopard seal (*Hydrurga leptonyx* de Blainville 1820) is widely distributed on the Antarctic pack ice and south to the edge of the continent, with seasonal northward movements related with ice conditions (Erickson *et al.*, 1971; Kooyman, 1981; King, 1983). The distribution also includes small permanent concentrations in Antarctic and Subantarctic islands as Heard (Gwyn, 1953; Brown, 1957), Auckland, Campbell (King, 1983; Reeves *et al.*, 1992) and Kerguelen (Bester, 1981; Bester and Roux, 1986; Borsa, 1990). Small seasonal groups are also recorded in Malvinas-Falkland (Hamilton, 1939; Laws, 1953), South Georgia (Hamilton, 1939; Walker *et al.*, 1998) and Macquarie (Rounsevell and Eberhard, 1980) Islands.

In the western South Atlantic a limited number of solitary leopard seals were found in Brazil (Widholzer, 1982; Ximenez *et al.*, 1987; Pinedo; 1990; Rosas *et al.*, 1992; Ferreira *et al.*, 1995), Uruguay (Vaz Ferreira, 1984; Naya and Achaval, Ms.), Tierra del Fuego (Goodall and Schiavini, 1987) and Patagonia (Crespo *et al.*, 1992). In northern Argentina the only record of a leopard seal was a male killed in Puerto Quequén in the forties (Castello and Rumboll, 1978). Beach surveys in northern Buenos Aires Province (36º20′ - 38º35′S) since 1987 resulted in four new records (Table 1).

The seals presented a poor physical condition and died a few hours later (records 8 and 9) or only the carcass was found (record 11); no food traces were found in the digestive tracts. The fourth animal (record 10) was alive but deeply wounded and unable to move. It could not be recovered for rehabilitation on this day and on the subsequent day we were unable to find it. It presumably died and the body lost during high tide. In the marine mammal collections of Buenos Aires and La Plata Museums in Argentina no additional leopard seal material from northern Argentina is deposited.

Leopard seals in northern Argentina were found between June and December, in agreement with the record of vagrants in Patagonia, Uruguay and Brazil. Ninety percent of the leopard seal vagrants are recorded from June to September (Figure 1). Similar seasonal patterns are recorded in South Georgia (April-November; Walker *et al.*, 1998), Macquarie (July-November; Gwyn, 1953), Malvinas-Falklands (spring and early summer; Hamilton, 1939) and Kerguelen (May-November; Bester, 1981; Kooyman, 1981; Bester and Roux, 1986; Borsa, 1990). A 3-5 yr. periodic peak of record of solitary seals has been suggested for Macquarie (Rounsevell, 1988; Testa *et al.*, 1991) and South Georgia Islands (Walker *et al.*, 1998).

Although not all measured, most of the animals were juveniles ranging from 200-250cm, corresponding to animals less than 3 years old (Hamilton, 1939; Brown, 1957). The presence of immature seals was also noted in Macquarie (Rounsevell 1988), Kerguelen (Borsa, 1990) and South Georgia (Walker *et al.*, 1998) Islands, but contrasts with the situation in Tierra del Fuego, where leopard seal vagrants are predominantly adults (4-25 years; Goodall and Schiavini, 1987). Laws (1957) and Hofman *et al.* (1977) suggested regional segregation by age, whereas the predominant presence of males in the western South Atlantic suggests a possible segregation or different dispersal capabilities by sex.

The pattern of occurrence of leopard seals in northern Argentina seems to be related both to feeding strategies and to the annual cycle of the species. Leopard seals are characterised as the most catholic of the seals, including penguin, seals, squid, crustaceans and fish in their diet (Hamilton, 1939; Gwyn, 1953; Brown, 1957; Hoffman *et al.*, 1977; Kooyman, 1981; Siniff and Stone, 1985). Changes in prey occurrence were reported along the years, with seals and penguins being important during pupping and fledging periods in summer. Siniff and Stone (1985) recorded an increase in krill occurrence during winter and suggested a potential winter competition with krill eaters (crabeater seals and Adelie penguins). Young leopards may have not the ability to exploit large prey like seals and penguins (Siniff and Bengstone, 1977; Walker *et al.*, 1998) and may be excluded by competition with the consequent influence in the dispersion of younger seals to northern areas. It was also suggested that older leopard seals might compete for accessing to areas of high resource concentration as seal and penguin colonies, excluding younger individuals (Bester and Roux, 1986; Borsa, 1990). The impoverished health condition found in animals from northern Argentina maybe an indicator of such dietary stress and was also recorded for young leopard seals in Kerguelen (Borsa, 1990). In areas of high concentration of potential prey as South Georgia, the animals are found in very good physical conditions (Walker *et al.*, 1998).

The sharp increase of the number of crabeater seal pups available as prey in November (Siniff *et al.*, 1979) and the pack-ice recession, corresponds with the declining record of *Hydrurga* vagrants in Subantarctic areas. The leopard seal breeding season also begins approximately in November when most of the births occur (Hamilton, 1939; Brown, 1957; DeMaster *et al.* 1979; Laws, 1984; Siniff and Stone, 1985), with mating apparently concentrated shortly after weaning in January-March

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Table 1. Records of *Hydrurga leptonyx* in the western South Atlantic.

RECORD	DATE	SEX	LENGTH (cm)	LOCALITY	COUNTRY	LATITUDE	REFERENCE
1	5 Aug., 1989	–	210 (*)	Rio de Janeiro	Brazil	21° 40' S	Rosas *et al.*, 1992
2	?, 1964	♂	– (*)	Florianópolis	Brazil	27° 40' S	Ximenez *et al.*, 1987
3	? June, 1981	♂	–	Praia de Cidreira	Brazil	30° 00' S	Widholzer, 1982
4	16 Sept., 1986	♂	? 200	Praia do Cassino	Brazil	32º 07' S	Pinedo, 1990
5	27 Aug., 1994	–	200	Albardão	Brazil	33º 15' S	Ferreira *et al.*, 1995
6	? Aug., 1981	–	? 243 (*)	Punta Palmar	Uruguay	34º 03' S	Vaz Ferreira, 1984
7	18 Sept., 2000	♀	225	Playa Piriápolis	Uruguay	34º 25' S	Naya and Achaval, Ms.
8	21 Dec., 1987	♂	–	San Clemente del Tuyú	Argentina	36º 21' S	Present Paper
9	1 June,1989	–	–	San Clemente del Tuyú	Argentina	36º 21' S	Present Paper
10	15 Aug.,2002	♀	? 300	San Clemente del Tuyú	Argentina	36º 21' S	Present Paper
11	3 Sept., 1995	–	– (ψ *)	Mar de las Pampas	Argentina	38º 05' S	Present Paper
12	?, 1944	♂	266	Puerto Quequén	Argentina	38º 35' S	Castello and Rumboll, 1978
13	1 Aug., 1994	–	–	Balneario El Cóndor	Argentina	41º 05' S	Crespo *et al.*, 1992

Obs.: (ψ) incomplete skeleton recovered and deposited in the Marine Mammal Research Group Collection of Universidad Nacional de Mar del Plata, with serial number GMM-HL-001; (*) cranial measurements included in Table 2.

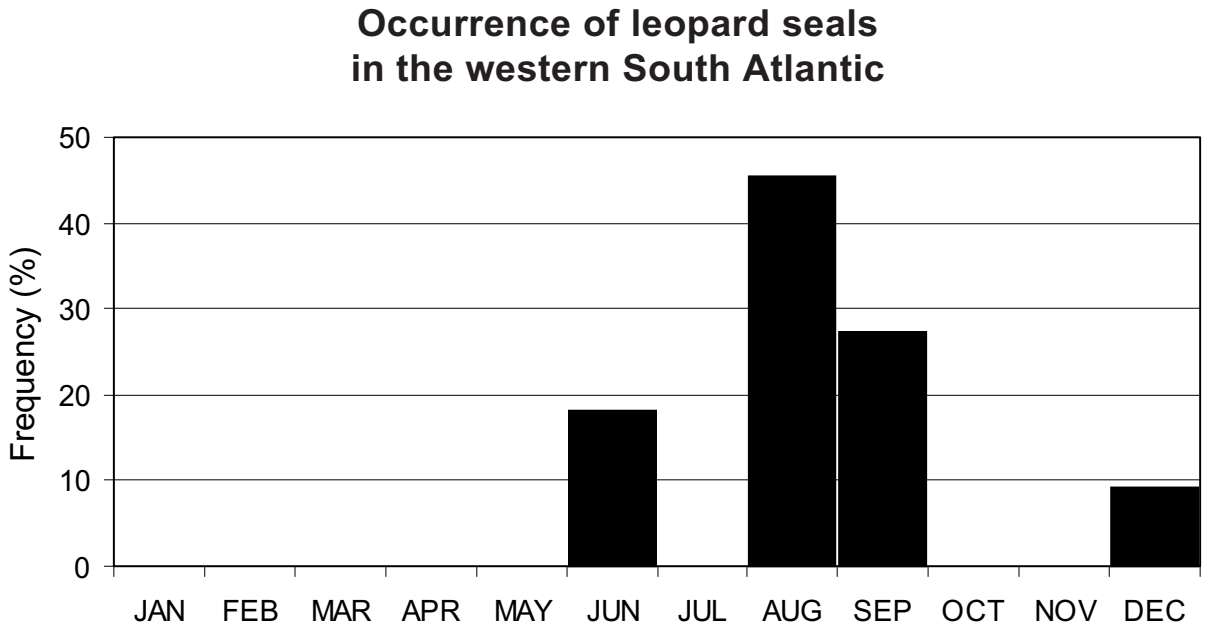

Figure 1. Monthly occurrence of leopard seals in the western South Atlantic, from a total of eleven records of Brazil (Widholzer, 1982; Pinedo; 1990; Rosas *et al.*, 1992; Ferreira *et al.*, 1995), Uruguay (Vaz Ferreira, 1984; Naya and Achaval, Ms.) and Argentina (Crespo *et al.*, 1992; present paper).

(Hamilton, 1939; Harrison, 1969; Sinha and Erickson, 1974). Sightings of leopard seals sharply decrease in the pack ice by mid-November to late December, coinciding with the mating period (Hofman *et al.*, 1977; Siniff and Stone, 1985).

The occurrence of leopard seals in temperate areas of the western South Atlantic from early winter to late spring is directly related with the northward dispersal of immatures from the Antarctic pack ice. Food competition during winter may force such animals to forage in Subantarctic areas close to South America and transported by the Malvinas-Falkland current to coastal areas. The onset of the breeding season and the increase of potential prey available around Antarctica may influence the sharp decline of the records at the beginning of the summer.

Table 2. Cranial measurements of Leopard seals found in the western South Atlantic.

Measurement (mm)	Present Paper		Rosas *et al.*, 1992		Ximenez *et al.*, 1987		Vaz Ferreira, 1984	
	Absolute	%	Absolute	%	Absolute	%	Absolute	%
Condylobasal Length	326.0	100.0	314.0	100.0	389.0	100.0	330.0	100.0
Basilar Length of Hensel	285.0	87.4	284.0	90.4	369.0	94.9	–	–
Greatest Length of Nasals	81.9	25.1	101.0	32.2	–	–	–	–
Width of Nasals	24.9	7.6	–	–	–	–	–	–
Greatest Width of Nasal Aperture	39.4	12.1	–	–	–	–	–	–
Width at Preorbital Processes	99.6	30.6	87.0	27.7	–	–	–	–
Palatal Notch-Incissors	116.0	35.6	120.0	38.2	–	–	–	–
Hamulo-premaxilar Length	–	–	196.0	62.4	–	–	190.0	57.6
Width of Skull at Canines	60.8	18.7	61.0	19.4	–	–	–	–
Length of Snout	61.9	19.0	–	–	–	–	–	–
Width of Zygomatic Root of Maxilla	–	–	34.0	10.8	–	–	–	–
Width of Palate at 5th Postcanine	66.0	20.2	65.0	20.7	–	–	–	–
Width at Pterygoid Hamuli	52.0	16.0	–	–	–	–	–	–
Palatal Margin to Pterygoid Suture	37.8	11.6	–	–	–	–	–	–
Interorbital Width	39.6	12.1	40.0	12.7	–	–	39.0	11.8
Zygomatic Width	167.0	51.2	157.0	50.0	225.0	57.8	185.0	56.1
Mastoid Width	171.0	52.5	159.0	50.6	–	–	–	–
Auditory Width	149.3	45.8	146.0	46.5	–	–	–	–
Height of Skull at Auditory Meatus	116.0	35.6	110.0	35.0	–	–	–	–
Height of Canines above Alveoli (upper)	31.4	9.6	34.0	10.8	–	–	–	–
Height of Canines above Alveoli (lower)	33.0	10.1	34.0	10.8	–	–	–	–
Length of Lower Post-canine series	81.0	24.8	–	–	–	–	–	–
Length of Lower Toothrow	116.5	35.7			–	–	–	–
Length of Upper Post-canine series	81.5	25.0	85.0	27.1	104.2	26.8	92.0	27.9
Length of Upper Toothrow	116.5	35.7	–	–	–	–	–	–
Length of Palate	129.5	39.7	–	–	–	–	142.0	43.0
Foramen Magnum Length	37.3	11.4	36.0	11.5	–	–	–	–
Foramen Magnum Width	35.0	10.7	34.0	10.8	–	–	–	–
Mandibular Length	236.0	72.4	237.0	75.5	306.0	78.7	–	–
Mandibular Width	22.2	6.8	23.0	7.3	–	–	–	–
Mandibular Heigth at M1	33.0	10.1	–	–	–	–	–	–
Upper Dental Formula	2-1-5		2-1-5		–		–	
Lower Dental Formula	2-1-4/5		2-1-5		–		–	
Sutural Age	11		–		–		–	

Obs.: Measurements are based on Burns and Fay (1970) and expressed in mm; in case of bilateral measurements, only the left one was taken. Sutural age was calculated following Sivertsen (1954).

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