Early Pupping of a sub-Antarctic fur seal at Inaccessible Island, Tristan da Cunha

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Abstract

A sub-Antarctic fur seal, *Arctocephalus tropicalis*, pup was located on Inaccessible Island in the Tristan da Cunha archipelago (TdC), well before the start of the annual breeding (pupping and mating) season in 2018. It was born a few days before 27 September 2018, at least 59 days before the next pup was observed on the island in 2018 and 75 days before the median birthdate for the species at the TdC. A malfunctioning of the obligate delay of implantation of the blastocyst in its mother was likely the cause of the early birth.

Key words: *Arctocephalus tropicalis*, breeding season, median birthdate, delayed implantation, early birth

Introduction

Sub-Antarctic fur seals are polygynous with males defending territories during the austral summer (Bester 1981). Females give birth within 6 days of arriving at the colony (Hofmeyr et al. 2016) over a highly synchronised period of approximately six weeks (Bester 1981) with population median birthdates that vary with latitude (Hofmeyr et al. 2007). Females spend the perinatal period with their newborn pup, oestrous lasts about one day (Daniel 1981) and occurs 6–10 days after

parturition at which time mating occurs (Hofmeyr et al. 2016). Following this, adult females depart on the first of a series of foraging trips that they will make before weaning their pup at approximately 10-11 months of age (Bester 1981, 1987).

The Tristan da Cunha (TdC) Islands are home to most of the estimated >400 000 world population (Hofmeyr and Bester 2018) of sub-Antarctic fur seals (*Arctocephalus tropicalis*). More than 80% of the global population breeds on Gough Island (Bester et al. 2006; Bester and Ryan 2007), southernmost and most isolated island in the archipelago at 40°19'S, 9°57'W. Much smaller numbers of fur seals breed at the three northern islands, centred on 37°04'S, 12°18'W: Tristan da Cunha, Inaccessible and Nightingale Islands (Bester et al. 2019). Inaccessible and Nightingale lie approximately 30 km to the southwest and south of TdC respectively.

Several fur seal population growth estimates exist for Gough Island (e.g. Bester et al. 2006), but only recently (January 2017) an incomplete count of pups was done on Inaccessible Island (Bester et al. 2019). An expedition to Inaccessible Island from 13 September to 1 December 2018 found a recently born pup well before the onset of the summer pupping season (Bester 1981). We speculate here on the likely reason for this occurrence.

Methods

Sub-Antarctic fur seal pups were searched for on foot during regular (average every 4 days) surveys of the rocky shoreline between West Point and Warren's Cliff, in the northwestern sector of Inaccessible Island between 13 September and 26 November 2018 (Fig. 1). Occasional visits were made to the coast south of West Point, but only two surveys went all the way to Dirleton Point, on 27 September and 4 November. A landing was effected on 1 December 2018 at Waterfall Beach and the area to north of Salt Beach was searched (Fig. 1).

Results and Discussion

On Gough Island, sub-Antarctic fur seal pups are usually born between the last week in November and the first week in January (Bester 1987), with the earliest birth recorded on 21 November 1975

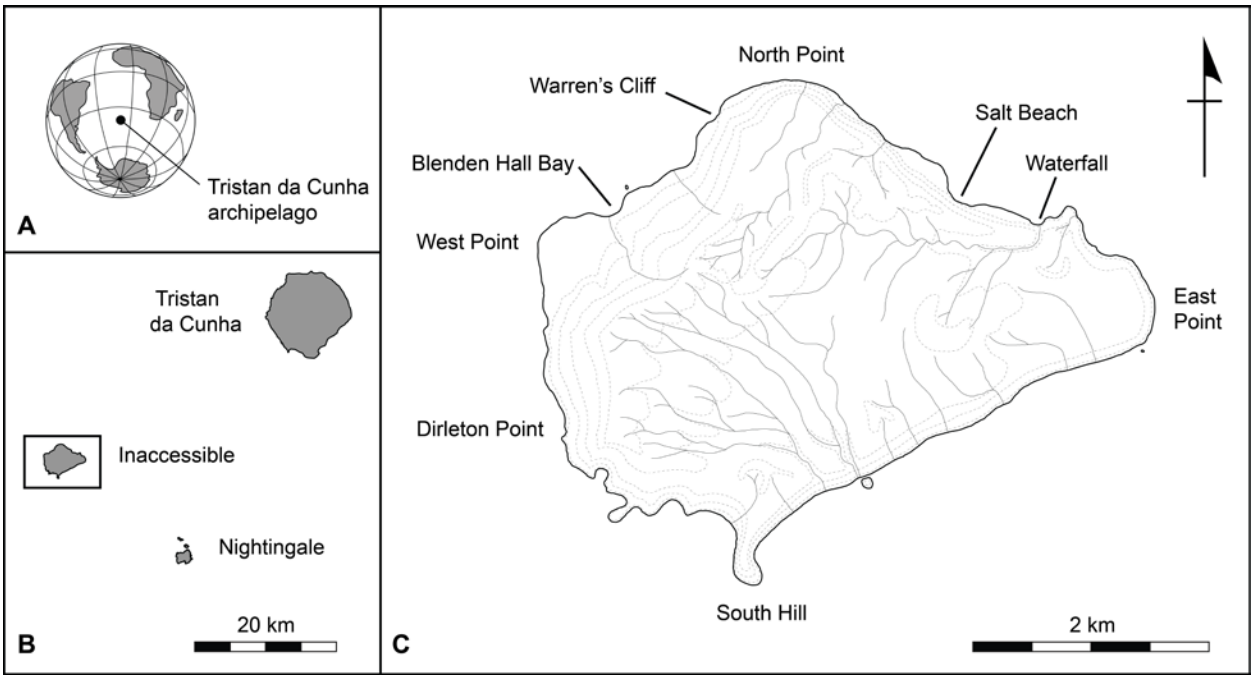

Fig. 1 A Position of the TdC archipelago in the Southern Ocean. **B** The position of Inaccessible Island in relation to the northern islands in the TdC archipelago. **C** Map of Inaccessible Island indicating all the places mentioned in the text, including Dirleton Point where the early presence of the sub-Antarctic fur seal pup was recorded.

(Bester 1981). On previous visits to Inaccessible Island in 1999, 2004 and 2009, the first pups also were only observed from late November (PGR unpubl. data). However, in 2018 a single pup was found near Dirleton Point (Fig. 1), a breeding colony site (defined in Bester 1982), on 27 September 2018, the earliest record for the species at the TdC Islands. The September pup appeared healthy (Fig. 2) and it must have been born some days earlier, as the umbilical cord, the presence of which confirms newborn status (Hofmeyr et al. 2007) was already lost and the pup's mother was absent, presumably away on a foraging trip (Bester 1995). There were other seals in the general area at the time, and the pup was not seen again during a subsequent visit to the area on 4 November, although it might have been overlooked among the large boulders in the vicinity. The next pup recorded on the island in 2018 was found on 25 November between Blenden Hall and Warren's Cliff, and by 1 December there were already a number of pups scattered along the coast from north of Salt Beach to Waterfall Beach (Fig. 1).

This is the first record of an early birth for the sub-Antarctic fur seal, but out of season births were recorded for the related Cape fur seal *A. pusillus pusillus* from lower latitudes in South Africa. There the bulk of pups are born within comparatively narrow time limits, from late October to the beginning of January (Kirkman et al. 2016). However, occasional out-of-season pups were encountered, on for instance, Sinclair Island where three pups were born early in July (Rand 1955).

Sub-Antarctic fur seal females arrive ashore within 6 days of pupping, and remain ashore for 6-10 days during the postnatal period, during which time they are impregnated (Hofmeyr et al. 2016). Sub-Antarctic fur seals then depart on the first of many foraging trips during the 10-11 month lactation period (Bester 1981, 1995). Post-partum females have 4.6 months (139 days) of delayed implantation (embryonic diapause) in sub-Antarctic fur seals (Bester 1995), similar to the otariid pattern of 3-5 months (Daniel 1981), before the blastocyst implants from around 19 April (Bester 1995). A single pup is produced approximately 9 months after implantation, over a six week period, centred on the median birthdate of 10/11 December on Gough Island (Bester 1981, 1995).

The birth of a pup shortly before 27 September on Inaccessible Island suggests that the female did not delay implantation, and that the blastocyst implanted soon after fertilization. Given that the mother was impregnated within 6 days after the median birthdate of pups (assumed to be the same here as at the 380 km distant Gough Island), she subsequently did not enter the expected 4.6 month

Fig. 2 Image of the apparently healthy sub-Antarctic fur seal pup on 27 September 2018 at Dirleton Point, Inaccessible Island.

period of delayed implantation. As a result, the pup was produced at most 286 days (9.5 months) later, a few days prior (i.e. the time taken for the umbilical cord to finally drop off) to 27 September 2018. This approximates the duration of active pregnancy (embryonic and foetal development) of about 9 months in sub-Antarctic and Cape fur seals (Bester 1995; Rand 1955).

Pups that might have been born pre-maturely by approximately 2.5 months (calculated as the interval between the early birth around 27 September and the median birthdate of conspecific pups) in all probability would have weighed around 1.3 to 1.7 kg. The latter is the mass range of foetuses (n = 3) of pregnant conspecifics at a comparable time (21 September to 2 October 1978) at Gough Island (MNB unpubl. data). It is therefore unlikely that the pup in question, judged to fall within the mass range of full-term newborn pups at Gough Island (2.6 to 6.3 kg, n = 13, sexes combined - Bester and Van Jaarsveld 1997), was born prematurely. Moreover, at a mass approximately half that of full-term newborns, it is moot whether such pre-mature pups would survive past parturition.

This early birth at Inaccessible Island thus represents a rare reproductive aberration in the sub-Antarctic fur seal (foregoing delayed implantation) rather than a shift in the phenology of the seasonal life cycle of the fur seals at the TdC Islands. This conclusion concurs with the negligible changes in female attendance patterns and median pupping dates of sub-Antarctic fur seals over the last 25 years at Marion Island, south Indian Ocean (Hofmeyr et al. 2016).

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Compliance with ethical standards

Conflict of interest: The authors declare that they have no conflict of interests.

Ethical approval: Field procedures were approved by the Animal Ethics Committee of the UCT.

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