

Stalked barnacles on an adult male sub-Antarctic fur seal at Inaccessible Island, Tristan da Cunha

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Abstract

An adult male sub-Antarctic fur seal, *Arctocephalus tropicalis*, on Inaccessible Island in the Tristan da Cunha archipelago (TdC), was observed infested with goose barnacles, likely *Lepas australis*. Although adult females have been recorded to carry goose barnacles, this is the first record from an adult male at a breeding island. Males remain at sea throughout winter, so it is not clear why there are not more records of goose barnacles attached to their pelage.

Key words: Sub-Antarctic fur seal, adult male, goose barnacles, Inaccessible Island

Introduction

The goose barnacle, *Lepas australis*, is pelagic with a circumpolar distribution between 30°S and 60°S (Nilsson-Cantell 1930, 1939; Foster 1978). Stalked barnacles attach themselves to a wide diversity of substrata (Barnes et al. 2004, Thiel and Gutow 2005), including seals and penguins (Reisinger and Bester 2010). Among both the sub-Antarctic fur seal *Arctocephalus tropicalis* and the closely related Antarctic fur seal *A. gazella*, stalked barnacle infestations typically only occur on females (Bonner 1968; Shaughnessy et al. 1988; Duck 1990; Barnes et al. 2004; Setsaas and Bester 2006; McIntyre et al. 2011). There is only one record of a stalked barnacle on an adult male sub-Antarctic fur seal: a vagrant male that came ashore in Gabon, well out of its normal range, supported a single goose barnacle (Zanre and Bester 2011).

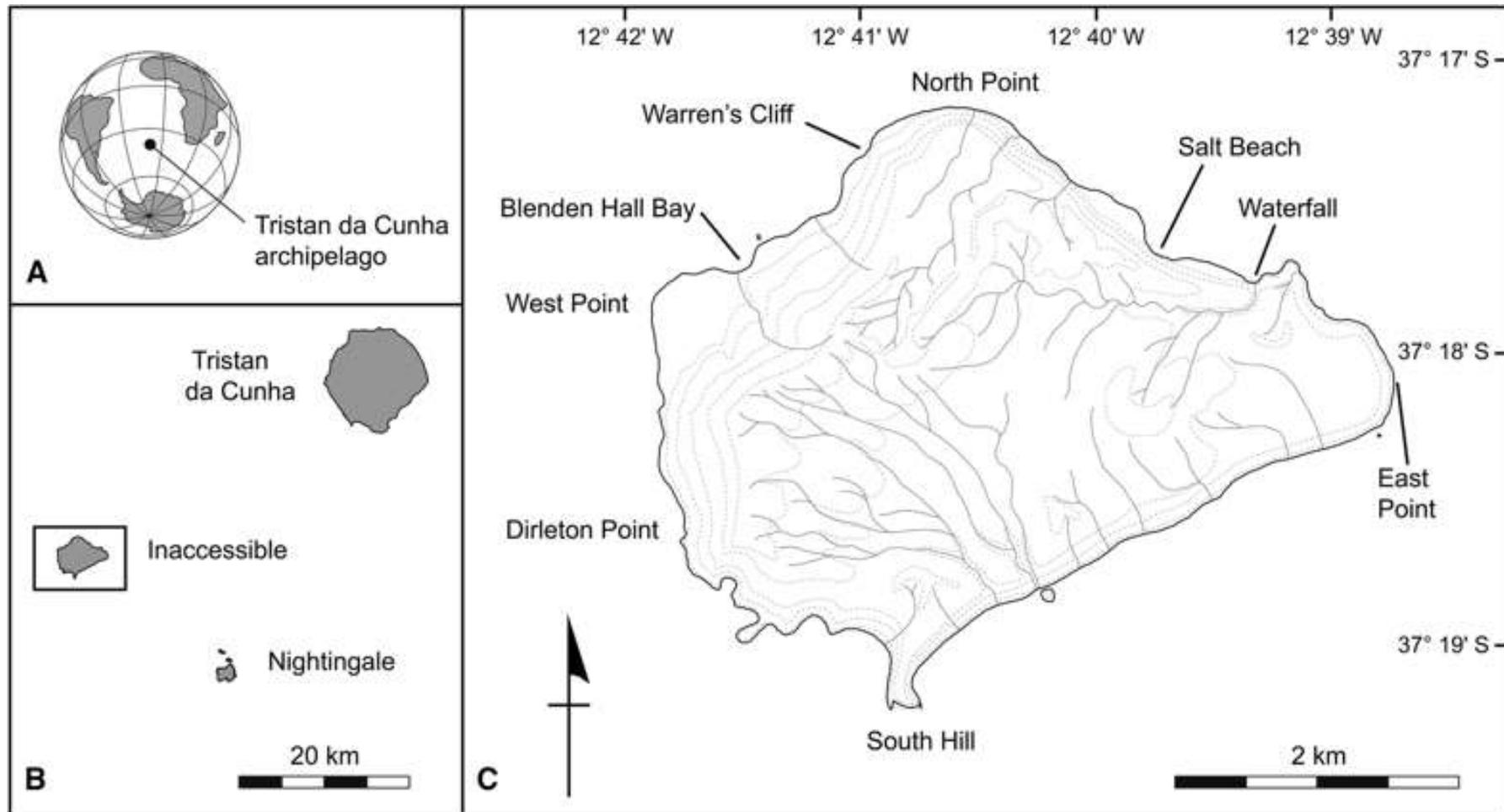


Fig. 1. **a** Position of the TdC archipelago in the Southern Ocean. **b** The position of Inaccessible Island in relation to the northern islands in the TdC archipelago. **c** Map of Inaccessible Island indicating all the places mentioned in the text

A recent expedition to Inaccessible Island, Tristan da Cunha Islands (Fig. 1a,b), from 13 September to 26 November 2018, found an adult male sub-Antarctic fur seal infested with small goose barnacles. The Tristan da Cunha (TdC) islands are home to more than 80% of the global population of sub-Antarctic fur seals (Bester et al. 2006; Bester and Ryan 2007). The overwhelming majority breeds on Gough Island, the southernmost and most isolated island in the archipelago at 40°19'S, 9°57'W. Much smaller numbers of 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). We speculate here on the likely reason for this unusual occurrence of an adult male sub-Antarctic fur seal infested with goose barnacles.

Methods

Sub-Antarctic fur seals were inspected on foot during surveys of the rocky shoreline of Inaccessible Island on most days from the east end of Blenden Hall Bay to West Point (1.1 km) between 15 September and 26 November 2018 (Fig. 1c). The focus was on locating pups of the season (Bester and Ryan 2019) rather than close inspection or even counting every one of the few hundred fur seals found present. Regular surveys (average every 4 days) occurred between Blenden Hall Bay and Warren's Cliff (0.9 km), and occasional visits were made to the coast south of West Point. Seals also were inspected during two landings on the island's east coast, at the Waterfall on 3 November and Salt Beach on 1 December (Fig. 1c).

Results and Discussion

Only one fur seal amongst the multitude was observed with a goose barnacle infestation: an adult male in seemingly good health photographed just east of Blenden Hall Bay, on 24 November 2018. This sheltered boulder beach is not a core breeding area (Bester et al. 2019), but supports hundreds of mostly female and immature seals. The male was resting on the mid-shore, but departed to sea upon being approached to photograph. It was not seen when the area was visited the following day. Small goose barnacles (not counted) were attached to the guard hairs of the pelage mainly on its back and rump (in an area proportionally less than 5% of the visible body area), but with at least



Fig. 2. Small clumps of goose barnacles attached to the pelage on the back of an adult male sub-Antarctic fur seal at Inaccessible Island on 24 November 2018

one also on the back of the head. The largest clump was on its central back (Fig. 2). Inspection of the photographs suggest that the barnacles are *L. australis* (O. Whitehead pers. com.), the species identified as infesting sub-Antarctic fur seals at Gough Island, 380 km to the southeast (Setsaas and Bester 2006; Reisinger and Bester 2010), although we cannot be absolutely sure (this study).

It is unclear where the barnacles originated or how long they had been attached, or whether they were still alive, as they die when a seal hauls out (Bonner 1968). Goose barnacles need about 50 days from settling to reach breeding size at sea temperatures of 11–16°C (MacIntyre 1966). We could not measure the goose barnacles, but their presence suggests that the male remained at sea after settlement prior to hauling out. Adult male sub-Antarctic fur seals are rarely found ashore during the austral winter, when they are reproductively quiescent (Bester 1990). The male probably hauled out in anticipation of the impending austral breeding season which commences in late November and peaks in December at nearby Gough Island (Bester 1981, 1987). Adult males depart from Gough Island at the close of the breeding season in January: there is a second, smaller peak in numbers ashore in March when some moulting males return briefly (Bester 1981, 1990). Therefore the male could have been at sea for as long as 8-10 months. A lengthy period at sea was also postulated to be the reason for the infestation of older, reproductively compromised, adult females as compared to adult females that were not infested (Setsaas and Bester 2006).

Given the protracted period males spend at sea between moulting and breeding, it is surprising that there have not been previous records of goose barnacles attaching to adult male fur seals. As goose barnacles apparently find it difficult to settle on the pelage of hydrodynamic free-swimming seals, it should affect adult male and female fur seals equally. Unless there are sexual/individual differences in their swimming/resting behaviour at sea. Goose barnacles seem to more readily attach to dataloggers affixed to both elephant seals (Reisinger et al. 2010) and fur seals (McIntyre et al. 2011). Dataloggers create a zone where water flow over the seal's body while swimming is likely to be turbulent, and suitable for the barnacle's initial attachment and nutrition (Reisinger et al. 2010). Similarly, goose barnacles attached to the exposed underfur on the rump of a hitherto unreported immature male (hand-caught, weighing 14,5 kg) sub-Antarctic fur seal with mange at Gough Island (20 January 1976). These did not attach to the guard hairs of the surrounding unaffected pelage where water flow likely would have been less turbulent. Whether such

hydrodynamic influences are central to the different infestation rates of male and female sub-Antarctic fur seals are impossible to determine.

The pelagic ranging behaviour of adult males during austral winter is unknown. Of 22 vagrant sub-Antarctic fur seals recorded between June 1966 and June 1979 on the continental South African coast, 13 (59%) were adult males (Shaughnessy and Ross 1980). Adult males also have been reported from the South American coast (Ferreira et al. 2008), South Georgia (Payne 1979) and Bouvetøya (Hofmeyr et al. 2006), suggesting that they travel widely during the austral winter. The distribution of the larval settlement stage of goose barnacles is not well known (Foster 1978) and it is impossible to even speculate where, and under which circumstances, the male in this study was infested. The wide-ranging movements of adult male sub-Antarctic fur seals suggest that they, too, are potential transport vectors for *L. australis* (McIntyre et al. 2011).

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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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