

## Historical sex-specific distribution of Atlantic walrus (*Odobenus rosmarus rosmarus*) in Svalbard assessed by mandible measurements

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**Abstract** We developed a discriminant function based on measurements of known-sex mandibles of walrus from the Canadian Arctic collected between 1963 and 1998 and used it to explore the sex ratio in the catches of walrus in Tromsøya, south-western Svalbard, during the nineteenth century. Canadian mandibles older than 5 years of age of known sex were classified into correct sex with 100% accuracy by using two measurements. Applying the same discriminant function to 80 mandibles from Svalbard older than 5 years of age classified 58 (100%) as males and 22 (100%) as females. It also classified 584 aged and un-aged mandibles from Svalbard: 67% (390) as males and 33% (194) as females. Eight of the aged jaws (10%) and 41 (7%) of the un-aged jaws had probabilities of classification into sex <0.05. We stress the importance of being cautious in applying a discriminant function developed from Canadian mandibles to classify the sex of old weathered mandibles from Svalbard. However, our results indicate that

female walrus were once more common in south-eastern Svalbard than they are now.

**Keywords** Atlantic walrus · *Odobenus rosmarus rosmarus* · Svalbard · Historical distribution · Morphometrics · Discriminant analysis · Sexual dimorphism · Mandible

### Introduction

In 1601 the first hunt of Atlantic walrus (*Odobenus rosmarus rosmarus*) occurred in Svalbard (Pocock 1604–1608), marking the beginning of the onslaught on the walrus population in this Arctic archipelago. By the middle of the nineteenth century the stock showed clear signs of decrease (Lamont 1861). The centuries of walrus hunting brought the reportedly large herds to the verge of extinction in Svalbard (Stoudanfang 1908), until they finally were given total protection in 1952 (Anonymous 1952). It is difficult to assess the size of the original population prior to hunting, but the Svalbard population must have been very large (Reeves 1978). Today the walrus at Svalbard and at Franz Josef Land in the western Russian Arctic are thought to comprise one common population (Gjertz and Wig 1994; Wig et al. 1996; Born et al. 2001).

Sexual segregation for part of the year is common in walruses (Fay 1965). However, in several areas in the Atlantic, male, females and young use the same terrestrial haul-outs in summer (e.g. Sather 1979; Miller 1982; Born et al. 1995). Most of the historic reports of walruses from Svalbard fail to mention the sex of the animals, and the information on distribution of females and calves in former days is accordingly scant (Gjertz and Wig 1994). Chydenius (1865) wrote that walrus cows and calves at Svalbard were found in other

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