

Decline in the pregnancy rate of Baltic grey seal females during the 2000s

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During the period 2000–2012 we witnessed a general increase in the Baltic grey seal (*Halichoerus grypus*) population size. Population growth has, however, ceased in the northern sea areas. The accompanying changes to age structure during this time suggest a reduced female pregnancy rate. In this study, we used hunted individuals to examine the ovulation and pregnancy rates of seals from different age classes and years. We examined the presence of *corpus luteum*, *corpus albicans* and placental scars from seals killed before the implantation period and fetuses after the implantation period. The pregnancy rate derived from the presence of *corpus albicans* or placental scars in the pre-implantation period was similar to that based on fetuses. Thirty-three percent of females ovulated at the age of 3 years, 81% at the age of 4 years and 99% thereafter. The pregnancy rate was lower among 4–5-year-old females (0.54–0.56) than among 6–24-year-old females (0.77–0.86), being highest in 7–11-year-old females. The pregnancy rate of 6–24-year-old females decreased from 0.89 in 2000–2004 to 0.66 in 2005–2011 and correlated negatively with population size. The decreased pregnancy rate suggests that grey seal numbers in the northern part of the Baltic Sea may be today close to the carrying capacity of the environment.

Introduction

According to estimates there had been about 100 000 Baltic grey seals (*Halichoerus grypus*) at the beginning of the 20th century but thereafter seal numbers declined and were lowest (about 2000–3000) in the 1970s (Jensen *et al.* 1969, Almkvist 1978, Bergman & Olsson 1986, Kokko *et al.* 1997, Bergman 1999, Harding & Härkönen 1999, Harding *et al.* 2007). One reason behind this dramatic decline was environmental pollution by organochlorines in the 1960s and 1970s,

which likely caused severe reproductive disturbances (Bergman & Olsson 1986, Bergman 1999, Harding & Härkönen 1999, Bäcklin *et al.* 2003, Nyman *et al.* 2003). Due to decreased levels of environmental pollution in the Baltic Sea during recent decades (Routti 2009), reproductive health of seals has gradually improved and in the 2000s, virtually no reproductive disturbances have been observed (Bäcklin *et al.* 2011, 2013a, Roos *et al.* 2012). Accordingly, Baltic grey seal numbers have increased since the 1980s, and in 2012 the number of grey seals