Increased reproductive output of Danish red fox females following an outbreak of canine distemper

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A decline in the Danish population of red foxes Vulpes vulpes due to an outbreak of canine distemper (CDV) in 2012 gave us the opportunity to test the hypothesis that the reproductive performance of foxes increases when the population density declines. The reproductive performance of 280 female foxes from two periods (mainly shot or road killed) in 1997-2000 and 2012-16, were compared. Game Bag Records of Jutland (GBRJ) were used as an estimate of population density. After a drop in GBRJ in 2013 due to the CDV epidemic, the mean litter size (based on dark placental scars from partum to oestrus) became significantly larger than in previous years; F=4.3, p>0.03, Hc=6.1, p<0.02. In 2015-2016, after population decline the mean litter size was 8.2 (±2.5 SD) and in the breeding seasons before population decline in 1997-1999 and 2012-2013 the mean litter size was 5.6 (±2.1 SD) and 5.7 (±2.0 SD), respectively. During the period 1997-1999, barrenness was relatively high especially in yearlings, and the reproducing yearling foxes made up only 6% of the breeding females compared to 2012-13 and 2015-16 where breeding yearling females made up 53% and 61%, respectively. Age related differences in litter size and productivity were found in years with a relatively high population density, when older females in their third and fourth breeding seasons had the largest litter sizes and highest productivity. This was in contrast to the years with low population size, when no age-related reproduction was found, and when young females had relatively large litter sizes and high productivity. Rump fat thickness (RFT) of the breeding females was significantly higher in breeding females than in barren females, and the RFT was positively correlated to the number of embryos (R2=41%). This study confirms that the number of barren females drops, and the proportion of yearling females and litter size increase with reduced population density. Hence, culling or epidemics in fox populations increase production, most probably due to reduced competition among foxes, but will not change population size permanently. The present level of culling and traditional hunting in Denmark has no long-term effect on population size.

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