Response of reindeer breeding time to a warming spring in Finnish Lapland

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Abstract

The breeding time of many taxa has changed over the past two to three decades in response to climate change. In order to predict how climate change will affect species' viability, it is crucial to understand how species base their reproductive efforts on environmental cues since breeding time in animals is a key reproductive trait affecting individual's reproductive success and therefore the population's recruitment rate and dynamics. Using long-term datasets of 45 years of birth dates, and mating behaviours and copulation dates recorded since 1996 of a semi-domesticated reindeer population in Kaamanen, North Finland, we show that calving season has advanced by ¯ 7 days between 1970 and 2016, the males' mating time by 11 days over 16 years and the females' copulation dates by 14 days over 18 years. The advancement of those phenological events were found to follow the climatic changes reported in the study area since earlier calving dates were associated with lower snowfalls and a reduced snow cover in April and warmer temperatures in April-May and males began to display mating behaviours earlier and observed copulation dates also occurred earlier following a warmer weather in May. An improved physical condition of individuals in response to warmer temperatures in early spring, facilitating availability of late winter food and early green-up of vegetation probably accounted for such observed advance in reindeer breeding time. That both calving and mating seasons were affected by climatic conditions at the same period of the year confirmed that timing of calving season appears to be the ultimate cause of the timing of the mating season. The plastic response of breeding time to climatic conditions in spring most likely allowed reindeer to adapt to climate change in Finnish Lapland and indicates that reindeer populations may be more resilient to climate change than previously acknowledged.

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