

# Sex-differentiated migration patterns during spring of North European song bird populations in relation to climate change

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Migratory birds have been shown to change timing of spring migration as a response to recent climate changes. However, former studies have focused on phenological changes at the species level. Therefore, little is known about how males and females are affected by the changing climate. If the sexes are reacting differently to environmental changes this may lead to inter-sexual mismatches in the timing of breeding area arrival. Sex-differentiated changes in the timing of arrival can influence subsequent mating decisions, with consequent feedbacks on population dynamics such as reproductive success and individual fitness. Here we present sex-differentiated migration patterns of eight North European passerines during spring migration in relation to the recent climate change. The data used are standardised ringing data collected through 22 years. For all studied species, we found, that both sexes are advancing spring arrival, and we found no inter-sexual differences in arrival trends. This result is consistent for the first, medium and last population parts. Thus, both males and female seem to change their spring arrival in response to the milder spring climate. Our results also show that males migrate faster than females: hence, degree of protandry is smaller for the first arriving population parts compared to later parts within species. Further, the degree of inter-sexual difference in the duration of the migration period is largely explained by the migration distance: species with longer migration distances show more synchronized inter-sexual migration patterns. Overall, it is indicated that males compete for early arrival in direct relation to female arrival implying that degree of protandry is determined by direct selection between the sexes.