

THE INFLUENCE OF CLIMATE
ON THE TIMING AND RATE OF SPRING BIRD MIGRATION

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ABSTRACT. - Ecological processes are changing in response to climatic warming. Birds, in particular have been documented to arrive and breed earlier in spring and this has been attributed to elevated spring temperatures. It is not clear, however, how long-distance migratory birds that overwinter thousands of kilometers to the south in the tropics cue into changes in temperature or plant phenology on northern breeding areas. We explored the relationships between the timing and rate of spring migration of long-distance migratory birds, and variables such as temperature, the North Atlantic Oscillation (NAO) and plant phenology using mist net capture data from three ringing stations in North America over a 40-year period. Mean April/May temperatures in eastern North America varied over a 5°C range, but with no significant trend during this period. Similarly, we found few significant trends toward earlier median capture dates of birds. Median capture dates were not related to the NAO, but were inversely correlated to spring temperatures for almost all species. For every 1°C increase in spring temperature, median capture dates of migratory birds averaged, across species, one day earlier. Lilac budburst, however, averaged three days earlier for every 1°C increase in spring temperature, suggesting that the impact of temperature on plant phenology is three times greater than on bird phenology. To address whether migratory birds adjust their rate of northward migration to changes in temperature, we compared median capture dates for 15 species between a ringing station on the Gulf Coast of Louisiana in the southern United States with the two stations approximately 2500 km to the north. The interval between median capture dates in Louisiana and at the both ringing stations was inversely correlated with temperature, with an average interval of 22 days, that decreased by 0.8 days per 1°C increase in temperature. Our results suggest that, although the onset of migration may be determined endogenously, the timing of migration is flexible and can be adjusted in response to variation in weather and/or phenology along migration routes.

Keywords: migratory birds, timing of migration, temperature, climate change, phenology.