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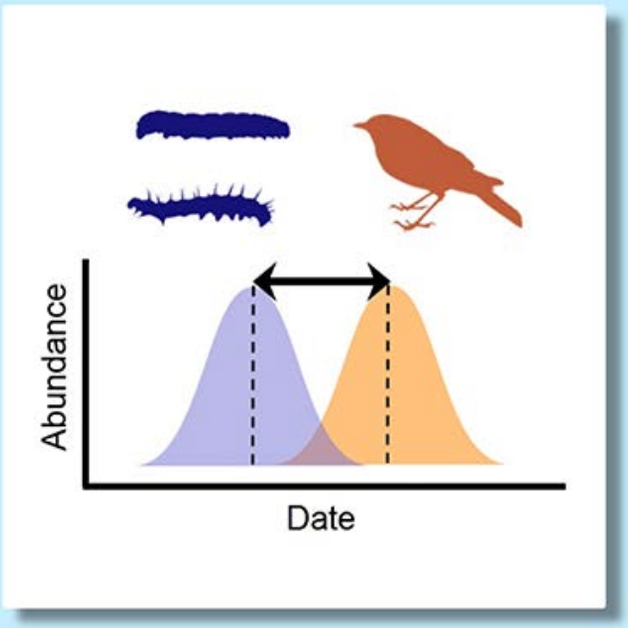

Mismatched Peaks of Migratory Bird Reproduction Periods and Food Availability

The Effects of Temperature and Green-up on the Timing of Arthropod Abundance and Avian Migration

Many bird species rely on the peak resource availability of arthropods to feed hatchlings. Migratory bird species must coordinate their migration and breeding to coincide with a period of peak resource availability where they raise their young, which is sometimes at a great distance from the location of other life events. Recent evidence suggests that migratory birds have been responding to climate change at different rates than their arthropod food sources, leading to phenological mismatches across trophic levels that have negative consequences for avian reproductive success. We characterized the seasonal variation of arthropods over the summers of 2015 and 2016 at the North Carolina Botanical Garden in Chapel Hill, NC and the Prairie Ridge Ecostation in Raleigh, NC. Occurrence was plotted for each day surveyed throughout the summer to generate a curve for each of the focal arthropod groups. Timing and magnitude of peaks in occurrence varied widely with arthropod order, year, and survey method. Caterpillars and orthopterans had stronger peaks than combined orders of arthropods that represent "bird food." Timing of peaks were then compared to 10-year trends of spring green-up and average daily temperatures. Since arthropods are only included in 2 years of data, green-up comparison dates and temperature comparison dates corresponded with arthropod peaks variably. We predict that avian migration timing will more directly align with temperature, since this phenomenon has been demonstrated on a larger scale throughout the eastern US. Beyond these findings helping to improve arthropod surveying for the purpose of characterizing phenology in the future, they also demonstrate the importance of testing a network of factors across trophic levels and time when considering the best options for conservation.