

# rest & recover

## The diverse functions of stopovers for migrants

**A**vian migration usually involves more time on the ground than in the air. Periods on the wing are punctuated by stopovers, with birds spending anything from a few hours to several weeks at one or more sites along migration routes. These stopover sites are critically important and add significantly to the challenges of conserving migrants; degradation of stopover sites by human activities can be just as detrimental to bird populations as habitat loss and other disturbances on the breeding grounds or wintering quarters.

Most research on stopover ecology has focused on the role of these sites for allowing birds to replenish fat and protein reserves depleted during the preceding leg of the journey, ensuring that they depart for their next destination with a full tank of metabolic fuel. But data sets collected using lightweight satellite trackers and other techniques are revealing that refuelling is not the sole (nor even always the primary) function of stopovers. On some Mediterranean islands, for instance, many migrants stop despite consistently poor foraging conditions and then depart within a day, a period most probably too brief for refuelling.

A recent review by Jennifer Linscott and Nathan Senner sheds new light on functions of stopovers other than refuelling. One involves physiological recovery processes, including periods of inactivity during stopovers that permit antioxidants to remove unstable oxygen-containing molecules known as free radicals, the toxic by-products of metabolism whose production is increased during intense exercise. Another recovery process may be allowing body temperature to cool down from hyperthermic levels caused by rapid heat production during flight, as recently found for Common Eiders.



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Sleep is another key recovery process that occurs during stopovers. Many normally diurnal birds fly at night and although birds possess the ability for unihemispheric sleep (during which one half of the brain is asleep and the other awake), this form of sleep is probably not sufficient for weeks-long migrations. One implication of the importance of sleep during stopovers is that the availability of roost sites may often be as important an indicator of habitat quality as the availability of food.

In addition to allowing physiological recovery during breaks from flying, stopovers can provide birds with information vital for making decisions about their onward migration. For migrants heading to the Arctic, conditions at stopovers as they approach their breeding grounds will provide an indication of whether the spring thaw has taken place, enabling them to adjust migration speed to avoid arriving on still-frozen tundra. Similarly, migrants heading towards southern Africa rely

*Long-distance migrants such as Barn Swallows rely heavily on stopover sites for successful journeys.*

on similar cues to adjust flight routes if they find themselves heading into drought-stricken regions.

Finally, social interactions during flight and at stopover sites can be essential for successful migration. Many migrants, such as European Bee-eaters, migrate in groups and, if separated, re-join the same group further along the route. In these group-migrating species, decisions about when to land at stopover sites are often influenced by more experienced individuals that have successfully made the trip many times before.

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### Reference

Linscott JA and Senner NR. 2021. 'Beyond refueling: investigating the diversity of functions of migratory stopover events.' *Ornithological Applications* 123: 1-14.