

SWIFTS - SLEEPING ON THE WING.

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The common swift (*Apus apus*) is the record breaker for non-stop flight, remaining airborne for 9 months of the year, only landing when breeding. Juveniles fly continuously for even longer. So how do we reconcile this extraordinary achievement of constant activity with the need to sleep?

Sleep is highly complex, and firstly we need to explore our notion of sleep, and question:

- What do we mean by “sleep”?
- Why do animals sleep?
- Do all animals sleep?

We have reviewed our present knowledge of sleep in animals, to help us deduce what is the likely, or possible, pattern of sleep in swifts...

It is often asserted that swifts can survive with only uni-hemispheric sleep, enabling one eye to be active at any one time. But is this the whole story? Uni-hemispheric sleep was first shown in aquatic mammals that need to be constantly active, and it has also subsequently been demonstrated in birds. However it is unlikely to be the only answer as REM sleep, an essential type of brain activity in most animals, only happens with both hemispheres active.

Studies on wading birds have shown they can survive for considerable periods with virtually no sleep, with those showing the longest sleeplessness being the most successful breeders. Using implanted electrodes to measure brain activity, studies on captive nocturnally migrating songbirds showed differences in brain wave sleep patterns according to the season. Chinstrap penguins have been shown to manage with thousands of micro-naps a day.

The only brain wave studies on birds *in flight* have been on homing pigeons and great frigate birds. Breeding frigate birds forage for up to 10 days at a time over the ocean without landing. It was found that their sleep is fragmented, totalling less than an hour per day, only in very short bursts, and that periods of bi-hemispheric sleep did occur in certain types of flight.

As yet we still do not have a direct answer as to exactly how swifts sleep. But by extrapolating from these studies we can gain some insight into what may be possible and whether swifts have refined even further the ability to survive with very little sleep.