ScienceWatch – Night School for Juvenile Migrants

Most songbirds migrate at night. Laboratory and field studies have shown that they use both the stars and a magnetic compass to navigate, and may also use the position of the setting sun - see – *ScienceWatch - Look for the Setting Sun Before You Go* (May, 2004) and *A Circle is the Shortest Line Straight Line for Migrating Birds* (April 2001). However, no matter what compass they use the question remains as to how juveniles, migrating at night for the first time, find their way to their wintering site and recognize their birthplace on the springtime return flight. Moreover, birds are normally asleep at night. So how do they gain the skills needed to accomplish these nocturnal feats?

Now a team of Russian ornithologists, led by Andrey Mukhin of the Max Planck Institute for Ornithology in Andechs, Germany has shown that young birds perform a series of "reconnoitering" night flights well before they leave home. Writing in the July 8, 2005 issue of the *Proceedings of The Royal Society*, Mukhin *et al*. studied Eurasian reed warbler (*Acrocephalus scirpaceous*) nestlings at a breeding site on the southeastern coast of the Baltic Sea. The birds are fully fledged by the age of 29 days and a few weeks later they migrate from this corner of Russia to their winter quarters in sub-Saharan Africa.

The team radio-tagged 27 juveniles and monitored their pre-migratory nocturnal activity. Strong changes in radio signals indicated that the birds began making nocturnal flights at the age of 38 days, but earlier, weaker signal changes suggested that even before their first flight, at age 30 days, the birds were actively moving around at night. First flight takeoffs were evenly distributed throughout the night, had no particular direction and generally lasted a few hours before the birds returned home. Actual migration did not begin until the birds were at least 50 days old. So the juveniles spent a total of about three weeks engaged in nighttime activities and flights around the study site. The onset of nighttime flights also occurred closer to sunset as the birds approached the time of migration, indicating they were increasingly restless to leave.

These results show that the Eurasian reed warbler has about three weeks to develop the skills it needs to successfully migrate at night. Learning apparently starts with nocturnal alertness, which is followed days later by short nocturnal flights. But what exactly are the birds learning during this pre-migratory period? Studies have shown that during the early stages of migration the celestial compass takes priority over the magnetic compass.

Mukhin *et al*. suggest that the juveniles must first be able to recognize features around their natal site at night, since they will make nighttime landings when they return to breed in the spring. Second, they need to be awake at night so they can watch the stars rotate in order develop the star map they will need to head out to their winter quarters. Apparently, the night flights allow the juveniles to gain both skills. Once they learn to recognize their birthplace and to navigate by the night sky the starry-eyed youngsters take off on their first great adventure.

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