

Early bird doesn't always get worm, researcher finds

Competing against older brothers and sisters can be tough work, as any youngest child will tell you. But new research from a biologist at the University of North Carolina at Chapel Hill shows that when it comes to some birds, you should reserve any underdog sympathies for the first born – or rather, first laid – siblings as well.

The finding, published in the March 12 issue of *PLoS ONE*, runs somewhat counter to common wisdom, which holds that baby birds that are laid before their brood mates have a better chance of surviving long enough to leave the nest.

But after studying a population of Lincoln's sparrows in a remote stretch of Colorado's San Juan Mountains, Keith Sockman, an assistant biology professor in UNC's College of Arts and Sciences, has discovered that first-laid eggs are, in fact, the least likely to hatch at all.

"I believe this is the first study to follow siblings from laying through fledging and demonstrate that the effect of laying order on hatching is very different from its effect post-hatching," said Sockman.

It is a well-documented fact that being born just a day or so later often sets the stage for a situation whereby youngest hatchlings die. That's because they're too small to compete against their feistier brood-mates for the limited resources provided by their parents. Such competitive disparities caused by hatching or birth order can be found in other animals – from beetles to marsupials to humans – which sometimes produce their young in series, then rear the resulting offspring simultaneously.

But Sockman says up until now, such observations have usually failed to take account of what happens to eggs before they hatch.

Female Lincoln's sparrows lay one egg per day, usually producing three to five eggs in total. While carefully observing and tracking the tiny birds for three breeding seasons, Sockman and his team of researchers noticed that typically, mothers do not settle down and start incubating the eggs right away, since they still have other concerns during the laying cycle, such as foraging for food.

Sockman believes this contributes to the lower probability that first-laid eggs will hatch at all – but also helps to ensure that overall, a greater number of reasonably healthy, strong and feisty chicks hatch and go on to develop into young birds.

"At these elevations, conditions can be fairly harsh even during the summer when Lincoln's sparrows breed," said Sockman. "It's often freezing at night, which is hard on an un-incubated egg, while daytime temperatures are warm enough to foster the growth of harmful microbes. As a result, since the mother sparrow isn't keeping them at the most optimal incubating temperature from day one, first-laid eggs can be exposed to environmental conditions that lower the chance those embryos will ever see the world outside their shell."

"If the female did start incubating all her eggs as soon as she laid them, it would increase the probability they'd all hatch. But it would also give a huge head start to those first-laid eggs and the chicks that emerge from them, putting their younger siblings at even more of a competitive disadvantage once they begin battling for food and their mother's attention," said Sockman. "It may also reduce the number of eggs she is capable of laying."

The mother's careful balancing of this trade-off enables her to end up with three or four relatively equally robust offspring, instead of one or two strong hatchlings and several "runts of the litter," said Sockman.

Sockman now intends to examine what, if any repercussions laying order has once young birds reach adulthood. "The severely competitive environment in the nest may have consequences on the individual's ability to compete for resources and mates the following year when it is reproductively mature," said Sockman.

Source: University of North Carolina at Chapel Hill

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