When young bluebirds don't leave the nest

February 19 2016

For a young male western bluebird, it might be better to live with one's parents as a helper for a year before starting a nest of one's own, according to a new study in *Behavioral Ecology*.

It's a unique and somewhat counterintuitive interplay of evolutionary tradeoffs that makes this kind of cooperative breeding advantageous for species like bluebirds, says Caitlin Stern, an SFI Omidyar Fellow and lead author on the paper with Janis Dickinson of Cornell University.

Female western bluebirds show an age bias, preferring to mate with older males. And bluebirds have high rates of extra-pair paternity, or EPP, where a female's social mate may not be the father of all her offspring. This means a young partnered male often shares more genetic material with the younger siblings in his parents' nest than the young of

his own nest. (In other words, he is often "more related" to his siblings, with whom he shares his mother's genetics and often his father's, than his mating partner's offspring.)

In addition, behavioral ecologists know that helping behavior often results in longevity. By sharing the workload, each individual in a cooperative system has a survival advantage.

Young bluebirds who stay home as helpers may increase both their parents' and their own lifespans, on average. For long-lived species like bluebirds, which can survive eight years, males may increase their reproductive fitness – the representation of their alleles in the next generation – over their lifetimes by delaying breeding and helping instead.

Behavioral ecologists usually expect to see helping behavior dominantly in monogamous populations with low EPP, where the helper is guaranteed a close genetic relationship to his younger siblings. However, the additional factors of age bias and longevity change the formula for bluebirds.

"If you have this combination of an age bias – such that young males are not likely to sire offspring in another male's nest but old males are – and if helpers and their parents have a survival advantage, you can get this evolution of helping behavior even in systems with high rates of EPP," says Stern.

The behavioral ecology literature is beginning to acknowledge the importance of considering a species' full life history when studying behaviors, says Stern. "Our study is a case-in-point for the need to do this," she says. "An individual's fitness accumulates over its lifespan, and we need to take that into account when we're looking at the evolution of behavior."

More information: Effects of load-lightening and delayed extrapair benefits on the fitness consequences of helping behavior. *Behavioral Ecology*, first published online February 17, 2016 DOI: 10.1093/beheco/arw018

Provided by Santa Fe Institute