

# A Bed Bug is Not as Bad Anymore to its Bird Host

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## Study Description

The blood-feeding swallow bug (*Cimex vicarius*) parasitizes colonially nesting cliff swallows (*Petrochelidon pyrrhonota*), and in the 1980s this relationship was a textbook example of the cost of ectoparasitism for social hosts. We discovered 35 years later that the negative effects of bugs on nestling swallows had diminished with time, and the survival of adult birds exposed to bugs had gradually increased. Cliff swallows have developed greater tolerance to swallow bugs, likely because the birds largely shifted from natural cliff nesting sites to artificial structures, which exposed them to more bugs than on cliffs. The study suggests that hosts can rapidly evolve defenses against high levels of parasitism.

These photographs illustrate the article “The cost of ectoparasitism in cliff swallows declines over 35 years” by Charles R. Brown, Stacey L. Hannebaum, Valerie A. O’Brien, Catherine E. Page, Bruce Rannala, Erin A. Roche, Gigi S. Wagnon, Sarah A. Knutie, Amy T. Moore, and Mary Bomberger Brown published in *Ecological Monographs*,  
<https://doi.org/10.1002/ecm.1446>



### Photo 1

Cliff swallows are colonially nesting birds widely distributed across much of western and central North America. They build gourd-shaped mud nests, and breeding colonies can range up to 6000 nests in size. Photo by Charles R. Brown.



## Photo 2

Swallow bugs are close relatives of human bed bugs and live in the cliff swallows' mud nests or the nesting substrate year-round. They feed on blood of both nestling and adult swallows, and a single nest can contain up to 3000 bugs. Photo by Art Gingert.



### Photo 3

Cliff swallows formerly nested almost exclusively on the sides of steep cliffs underneath horizontal overhangs, where colonies tended to be smaller, the nests less stable, and swallow bug populations smaller than after the birds' switch to artificial nesting sites. Photo by Charles R. Brown.



#### Photo 4

As artificial structures such as bridges, buildings, and highway culverts increased throughout much of North America, cliff swallows switched to nesting on these sites almost entirely in many parts of their range. This switch exposed them to more swallow bugs than when the birds used cliff nesting sites. Photo by Charles R. Brown.

**Photo 5**

By repeating experiments from the 1980s in which we fumigated some nests in colonies to remove swallow bugs and left others exposed to natural numbers of bugs, we demonstrated that swallow bugs are less costly to cliff swallows now than they were 35 years ago. Photo by Stacey L. Hannebaum.