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An Incubating Orange-breasted Falcon (*Falco deiroleucus*) as Host for a Vampire Bat

Key Words: *Orange-breasted Falcon*; Falco deiroleucus; *vampire bat*; Desmodontinae; *parasitize*.

The Peregrine Fund has been studying Orange-breasted Falcon (*Falco deiroleucus*) populations in Belize and Guatemala for more than two decades (Baker et al. 2000, Thorstrom et al. 2002). Recently, cameras have been placed at accessible eyries to gather more information on nesting behavior and reasons for nest failure, should it occur.

On 3 April 2008, we placed a Speco Technologies WC-2503 wireless color weatherproof infrared video camera, connected to an ARCHOS AV500 Digital Video Recorder, at an Orange-breasted Falcon nest located on the crest of one of the Mayan temples in Tikal National Park (17°14′N, 89°37′W), Guatemala. The distance from the nest to the camera was approximately 50 cm. The nest was located on an exposed ledge, tucked into a corner formed by the meeting of two stone walls. The camera recorded almost continuously, 24 hr/d, until 12 April 2008, except for a 3–4-hr period every third day during which the batteries were recharged and replaced. A total of approximately 200 hr was recorded from 3–12 April.

On the night of 11 April and into the morning of 12 April 2008, our nest camera recorded three video sequences of a vampire bat (Desmodontinae sp.) blood-feeding on an adult female Orange-breasted Falcon while she was incubating three eggs. At 21:21 H on 11 April, the bat first appeared on camera as it climbed down the wall near the nest, then positioned itself on the wall directly above the incubating female, which sat approximately 0.5 m away. The bat remained still, hanging from the wall, for 3 min. At 21:24 H, the bat crawled down the wall and beneath the falcon, making the bat difficult to observe. However, it appeared to have bitten the falcon on the upper left tarsus, as two dark spots, which appeared to be blood, became visible several minutes later. The falcon seemed slightly irritated by the bat, rising and preening occasionally, and

walking around, with the bat still attached to the tarsus, before settling back onto the eggs.

This video sequence terminated at 21:35 H. The second sequence began immediately afterwards (still at 21:35 H), and continued for 1 hr and 2 min (until 22:37 H). The bat was observed beneath the falcon for the duration of this sequence. Due to the short lag time between these two sequences (less than 60 sec), we presumed that the same individual bat was filmed in both sequences.

Due to technical issues, most likely related to the battery, the camera did not record between 22:37 H and 03:33 H. The third and final sequence began at 03:33 H on 12 April and lasted only for 4 min due to battery failure. This sequence showed the falcon picking at her left tarsus, which had visible wounds, and a vampire bat clinging to the underside of the bird. Because of the gap between the second and third sequences, it was unknown whether the same bat continually fed on the female falcon for several hours, whether the bat seen in the second sequence left the nest and returned to feed again on the falcon later that night, or whether the bats seen in the second and third sequences were different individuals. The failed camera battery was not replaced, so we do not know whether the bat returned to the falcon's nest on the following nights.

Though all species of vampire bats have been known to feed either on wild birds or on poultry (Mayen 2003), to our knowledge this is the first documented case of a vampire bat blood-feeding on a wild diurnal raptor. Because of the distance between the camera and the subjects and the hazy quality of the infrared recording, we were unable to positively identify the species of vampire bat seen in the video sequences; however, all three known species of vampire bats occur in Guatemala and all are relatively small in size (65–90 mm in total length and 35–50 g mass; Redford and Eisenberg 1999) compared to the female Orange-breasted Falcon, which measured about 390 mm in total length, with a mass of 550–700 g (Berry et al. 2009). The common vampire bat (*Desmodus rotundus*) is widespread throughout the region, and though it reportedly preys mainly on mammals, particularly livestock (Bahlman and Kelt 2007), it has fed on birds (Luna-Jorquera and Culik 1995). The white-winged vampire bat (*Diaemus youngi*) feeds on the blood of free-ranging turkeys and chickens as they roost in trees at night (Sazima and Uieda 1980), but has been documented only in the northern and western parts of Guatemala and has not been recorded in the area where the Orange-breasted Falcon we observed was nesting (Reid 1997). However, our study site was <200 km from the documented range of the white-winged vampire bat; therefore, this species could not be ruled out. The hairy-legged vampire bat (*Diphylla ecaudata*) specializes in feeding on birds and is widespread across the region (Reid 1997). Based on this information, we concluded that *D. ecaudata* was most likely the species we recorded parasitizing the adult Orange-breasted Falcon.

There has been a pair of resident Orange-breasted Falcons in Tikal for at least nine years. The pair has made nesting attempts each breeding season for those 9 yr, but has only successfully fledged young three times: in 2005, 2009, and 2010 (Berry et al. 2010). We hypothesize that parasitic vampire bats could have a detrimental effect on the nesting female and/or the young, which may play a role in nest failure.

Our observation of vampire bat parasitism on these falcons raises additional questions. Could infectious diseases be transmitted by vampire bats, and if so, might they have an effect on Orange-breasted Falcon populations? How vulnerable are nestlings to parasitism by vampire bats and could they survive such an attack? How common is it for vampire bats to blood-feed on Orange-breasted Falcons and other diurnal raptors? In 2006, we recorded about 1000 hr of video footage using the same camera system at an Orange-breasted Falcon eyrie in Belize, and recorded no vampire bat parasitism. More study is needed to answer these and other questions regarding the occurrence and possible effects of bat parasitism on nesting success and population dynamics of the Orange-breasted Falcon.

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