LETTERS

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FIRST REPLACEMENT CLUTCH BY A POLYANDROUS TRIO OF BEARDED VULTURES (*GYPAETUS BARBATUS*) IN THE SPANISH PYRENEES

The Bearded Vulture (*Gypaetus barbatus*) is a territorial, cliff-nesting accipitrid vulture whose diet basically consists of bones. Monogamy is the most common mating system (del Hoyo et al. 1994, Handbook of the birds of the world. Vol. 2. New world vultures to guineafowl. Lynx Edicions, Barcelona, Spain) although some cases of polyandry (15% of 92 territories in 2000) have been documented in the Pyrenees (Heredia and Donázar 1990, *Biol. Conserv.* 53:163–171). Information available about some aspects of its breeding biology (e.g., clutch size, egg-laying, and hatching asynchrony) is scarce because nest sites are generally inaccessible and the adverse weather conditions in winter make study difficult. Replacement clutches rarely have been documented because observations during the breeding season are mostly conducted sporadically to obtain breeding parameters such as productivity and breeding success. To our knowledge one observation of a replacement clutch has been documented recently in a monogamous pair on the French side of the Pyrenees (Margalida et al. 2001, *Vulture News* 44:27–30). In this pair, egg-laying took place on 3 January 1999 and a breeding failure was observed after 13–14 d of incubation. The clutch replacement took place 28–34 d after the initial breeding failure and the chick fledged between 22–25 August when it was 124–127-d old.

In this letter, we describe the first clutch replacement observed in a polyandrous trio of an intensively-monitored Bearded Vulture breeding population in the Spanish Pyrenees. Between 1992 and 2000 we monitored (see Bertran and Margalida 1999, *Condor* 101:164–168, Margalida and Bertran 2000a, *Ardea* 88:259–264, Margalida and Bertran 2000b, *Ibis* 142:225–234) 14–19 nests per year, with a total of 138 breeding attempts observed in Catalonia (NE Spain). In this population the mean laying date was 6 January (range = 11 December–12 February, Margalida et al unpubl. data). During the breeding season of 2000 the first replacement clutch was observed. Egg laying took place on 13–16 January. On 21 January, incubation was still going on normally. On 22 January, breeding failure was confirmed although the cause was unknown. The breeding trio remained in the nesting area, but was not closely watched during the subsequent period. On 3 February, during a routine check of the nesting area, the three adult birds were seen near the nest. The next visit was on 25 February, when an adult was observed incubating inside the nest cave. Incubation proceeded normally and the egg hatched before 18 April (on 8 April an adult was still incubating and on 18 April an adult was observed feeding). Taking into account that the mean incubation period in the Pyrenees is ca. 54 d (pers. observ.), the replacement clutch would have been laid between 14–25 February, 24–35 d after the initial breeding failure. The chick fledged between 28–31 July when it was >102-d old.

This is the first replacement clutch confirmed for the southern side of the Pyrenees. The second clutch could not have been laid by birds other than the polyandrous trio after breeding failure, given the territorial behavior of the species (Margalida and Bertran 2000b). The interval between breeding failure and replacement laying was in agreement with the one case observed in the French Pyrenees (Margalida et al. 2001) and the mean 25-d interval that has been described for the Eurasian Griffon (*Gyps fulvus*) (Martínez et al. 1998, *Ornis Fenn.* 75: 145–148).

Although replacement clutches have been described in other vulture species (Mundy et al. 1992, The vultures of Africa, Academic Press, London, U.K.), there are very few records, and successful replacement clutches are rare. The fact that so few cases are known for large vultures suggests that the costs imposed of producing replacement clutches are probably higher than the potential benefits. In the studied case, increased collective parental contribution of the three adults may have favored the successful replacement clutch. However, in the French Pyrenees case, successful rearing from a replacement clutch was achieved by a monogamous pair. We believe that a successful second breeding attempt may be related to an initial early clutch followed by premature breeding failure. Late laying dates would delay fledging to the period when nest building begins (Margalida and Bertran 2000b), and could influence the body condition and the reproductive success of the following breeding attempt (see Chastel et al. 1995, *Auk* 112 964–972). The low frequency of replacement clutches in this species may be due to the fact that natural selection may favor a low reproductive effort in any one season in the interest of improving the probability of breeding in future seasons (Newton 1979, Population ecology of raptors, T. & A.D. Poyser, Berkhamsted, U.K.). The long life expectancy in this species, the long breeding season (2 mo of incubation and 4 mo of chick-rearing), and the cost

of parental investment by the adults of successfully rearing a chick (Margalida and Bertran 2000b) might explain the low frequency of replacement clutches.

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MISSISSIPPI KITES USE SWALLOW-TAILED KITE NESTS

Mississippi Kites (*Ictinia mississippiensis*) occasionally use old nests of other bird species like the American Crow (*Corvus brachyrhynchos*) and Chihuahuan Raven (*Corvus cryptoleucus*) for nesting (Parker 1999, *In* A. Poole and F. Gill [EDS.], The birds of North America, No. 402. The Academy of Natural Sciences, Philadelphia, PA and The American Ornithologists' Union, Washington, DC U.S.A.). Here, I report the first accounts of Mississippi Kites using failed, abandoned Swallow-tailed Kite (*Elanoides forficatus*) nests.

Along the Gulf Coast, Mississippi Kites and Swallow-tailed Kites often nest near each other where the habitat is suitable (J. Coulson unpubl. data), as they also do in coastal South Carolina (Cely 1987, *J. Raptor Res.* 21:124). In illustration of this close nesting association, a pair of Swallow-tailed Kites used an old Mississippi Kite nest of the previous year (Cely 1987). Arrival and nesting times appear to be staggered, with the majority of the Mississippi Kites nesting about three to four weeks later than Swallow-tailed Kites. In the Pearl River Basin located on the Mississippi-Louisiana border, most Swallow-tailed Kites arrive on the nesting grounds by early to mid-March. In this area, most Mississippi Kites do not arrive on the nesting grounds until early to late April (Lowery 1974, Louisiana birds, 3rd Ed., Louisiana State Univ. Press, Baton Rouge, LA, U.S.A.; J. Coulson unpubl. data). Nesting times between species differ similarly in South Carolina, although both species arrive later (Cely 1987).

In the spring and summer of 1997, a pair of Mississippi Kites nested 50 m from an occupied Swallow-tailed Kite nest in a subdivision, Pearl River, St. Tammany Parish, Louisiana. Both species nested in loblolly pines (*Pinus taeda*). The Mississippi Kite nest tree was 6 m from an occupied house. One young fledged from each nest. I did not mark any adults of either species and do not know if birds returning to the area in following years were the same individuals. In 1998, both species of kites refurbished and used nests from the previous year, and again one young fledged from each. In 1999, a pair of Swallow-tailed Kites reused the old nest, but on 4 May a severe storm with high winds passed through the study area. I visited the nest the following day and found a broken egg under the nest along with nest material (moss, lichens, and lichen-covered twigs). A substantial limb (3 cm in diameter) that supported part of the nest had snapped off and was near the broken egg. The disheveled nest's base was dislodged and no longer tucked into the fork of the nest tree. The pair of Swallow-tailed Kites did not return to this nest after the storm.

On 18 May 1999, an adult Mississippi Kite was incubating on the failed Swallow-tailed Kite nest, which appeared to have received few repairs. The nest was a typical Swallow-tailed Kite nest, sticks adorned with trailing curtains of Spanish moss (*Tillandsia usneoides*) and topped with a layer of fruticose lichens (*Usnea* sp.). Mississippi Kites rarely to occasionally use a small amount of Spanish moss or lichens for nest building, depending on the region (Cely 1987, Parker 1999). One fledgling was produced in this nesting effort.

In the spring of 1999, a pair of Swallow-tailed Kites nested in a sweetgum (*Liquidambar styraciflua*) on the Atchafalaya National Wildlife Refuge, St. Martin Parish, Louisiana, but their nest failed during incubation because of high winds On the subsequent visit I found a large supporting limb (3.5 cm in diameter) on the ground directly below the nest. On 4 June 1999, there was an adult Mississippi Kite on this nest with at least one nestling. The outcome of this nesting is not known because it was not revisited.

Swallow-tailed Kites reused their old nests at 1 out of 28 nests in South Carolina and at 4 out of 17 nests in Florida (Meyer 1995, *In* A. Poole and F. Gill [EDS.], The Birds of North America, No. 138. The Academy of Natural Sciences, Philadelphia, PA and The American Ornithologists' Union, Washington, DC U.S.A.). Mississippi Kites reused their old nests between 16% and 50% of the time, depending on the study area and sample size (Parker 1999). Reusing