SIBLICIDE IN BONELLI’S EAGLE (AQUILA FASCIATA)

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Siblicide occurs when dominant siblings kill a subordinate sibling by injury or starvation, or when a subordinate falls from the nest in an attempt to escape from its attackers (Newton 1979, Mock and Parker 1997, Morandini and Ferrer 2015). This behavior occurs in a wide range of bird species including raptors, Ciconiformes, Gruiformes, Pelecaniformes, and Charadriiformes, among others. In some species and/or populations, this behavior happens occasionally, usually associated with situations of food scarcity or long interval between the hatching of siblings, and then it is called “facultative siblicide.” In contrast, when the lowest ranking sibling is routinely killed by its dominant broodmate, this is termed “obligate siblicide” (reviewed in Mock and Parker 1997, Morandini and Ferrer 2015).

Among raptors, siblicide has been recorded in species of the genera Gypaetus, Neophron, Aquila (including species of the former genus Hieraaetus), Harpia, Stephanorhina, Elandeis, Milvus, Buteo, and Accipiter, among others. This behavior is more common among eagle species, in which it is sometimes called cainism (Meyburg 1974), and it has been described as obligate in some populations of Lesser Spotted Eagle (Clanga pomarina), Tawny Eagle (Aquila rapax), Verreaux’s Eagle (A. verreauxii), Wahlberg’s Eagle (Hieraaetus wahlbergii), African Hawk-Eagle (A. spilogaster), Booted Eagle (H. pennatus) and Crowned Eagle (Stephanorhina coronata). In the present letter, we describe the occurrence of two events of siblicide caused by aggressive behavior in one population of Bonelli’s Eagle (Aquila fasciata) located in Catalonia (northeastern Iberian peninsula). Siblicide has been reported in a closely related species, the African Hawk-Eagle, and some populations demonstrate obligate siblicide (Meyburg 1974, Steyn 1983, Simmons 1988). In Bonelli’s Eagle, siblicide involves enforced starvation of the smallest nestling, particularly when hatching is very asynchronous (Real 1987). In this sense, Real et al. (2000) found that among 179 nestlings in our study population (1987–1993), 2.2% died as a consequence of very asynchronous hatching (22.2% of dead nestlings). However, to our knowledge the events we describe here are the first reported records of siblicide caused by injury in Bonelli’s Eagle. We contextualize these events in the framework of a long-term monitoring carried out in this population over the last 35 yr.

Bonelli’s Eagle is territorial raptor distributed from southeastern Asia and the Middle East to the western Mediterranean (del Hoyo et al. 1992). The European Bonelli’s Eagle population is estimated at 920–1100 pairs and that population is classified as near-threatened (BirdLife International 2004) and is protected by special conservation measures (Directive 2009/147/EC of the European Parliament). The main threats appear to be decreased fertility and increased mortality (Hernández-Matías et al. 2013), driven by persecution, electrocution, deterioration and loss of suitable habitat, decreasing prey availability, and interspecific competence (Real 2004). In Europe, this species is strongly associated with the Mediterranean region, where it mainly nests on cliffs, although in southern Portugal, most pairs nest in trees (Real 2004). Females lay one or two, rarely three, eggs per clutch and mean productivity rates range between 0.6 and 1.4 fledglings per pair per year (Hernández-Matías et al. 2015).

During 1980–2015, we measured productivity for 1506 nesting attempts in territories occupied by a pair of eagles; of these nesting attempts, 65.7% resulted in at least one fledged young. Of these successful nesting attempts, 39.8% fledged one young, 59.7% two young, and 0.5% three young. We also ringed 419 nestlings of this population in 1986–1992 and 2008–2015. Monitoring effort in terms of surveyed territories was particularly intense and constant after 1990 (1980–1990: mean ± SD: 23.3 ± 7.5 territories; 1991–2015: 49.4 ± 4.3 territories), though the time and nature of observations varied. In general, we made three visits at the time when young were in the nests (just after hatching, at the age of approximately 20 d, and just prior to fledgling). More effort was expended in 1980–1993 and 2008–2015 when, respectively, 165 and 388 nesting attempts were monitored at least five times during the nesting stage. Additionally, in 1984–1988, four territories (10 nesting attempts) were intensively observed from a blind for 1230

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