FIRST BREEDING SUCCESS OF OSPREY (PANDION HALIAETUS) IN MAINLAND SPAIN SINCE 1981 USING CROSS-FOSTERING

Authors: Muriel, Roberto, Ferrer, Miguel, Casado, Eva, and Schmidt, Daniel

Source: Journal of Raptor Research, 40(4) : 303-304

Published By: Raptor Research Foundation

URL: https://doi.org/10.3356/0892-1016(2006)40[303:FBSOOP]2.0.CO;2

LETTERS

J. Raptor Res. 40(4):303–304

FIRST BREEDING SUCCESS OF OSPREY (*PANDION HALIAETUS*) IN MAINLAND SPAIN SINCE 1981 USING CROSS-FOSTERING

KEY WORDS: *Osprey*; Pandion haliaetus; *breeding*; *fostering*.

The current status of European populations of Osprey (*Pandion haliaetus*) is clearly different among regions (Saurola 1997, *J. Raptor Res.* 31:129–137). Although the central and northern areas of Europe support large populations in favorable conditions with increasing or stabilized trends, the situation in the Mediterranean basin is unfavorable, with few, small and isolated populations (Thibault et al. 2001, Le Balbuzard pêcheur en Corse: du martyre au symbole de la protection de la nature, Ed. Alam, Ajaccio, France). In Spain there are only two small breeding populations, each consisting of about 15–20 pairs, both in insular territories: the Canary Islands and Balearic Islands (Martí and Moral 2003, Atlas de las aves reproductoras de España, Ministerio de Medio Ambiente, SEO/BirdLife, Madrid, Spain). The species was extirpated from mainland Spain after 1981, when the last pair bred in the province of Alicante (Urios et al. 1991, Atlas de las aves nidificantes de la Comunidad Valenciana, Generalitat Valenciana, Valencia, Spain), after a continuous decline in the number of breeding pairs since the 1960s.

The Iberian Peninsula is an important passage area for migratory Ospreys traveling between Europe and wintering grounds in Africa, and a small number of northern European birds winter in southern Spain (Saurola 1997). Despite apparently suitable breeding conditions (Casado 2005, *J. Raptor Res.* 39:168–173), Ospreys have been unable to recolonize the region, perhaps due to natal philopatry and low breeding dispersal (Poole 1989, Ospreys: a natural and unnatural history, Cambridge Univ. Press, Cambridge, U.K.).

To accelerate the return of the Osprey to the Iberian Peninsula, a reintroduction program commenced in 2003 in the region of Andalusia (Casado 2005). Between 2003 and 2005, 42 young Ospreys were released, by means of hacking, at two locations: a reservoir in the province of Cádiz and a coastal marshland in the province of Huelva.

In 2005, after 2 yr of releasing juveniles and observing interactions between adults and released young, we recorded three nest construction attempts by different non-reintroduced Osprey pairs close to the hacking site in Cádiz. All attempts were less than 40 km from the release point and one was only 2 km away, in the same reservoir. Only one of these three pairs constructed a complete nest and made a breeding attempt, at a reservoir 30 km from the nearest release point. The nest was built on top of an inactive power pole situated over the water near the shore. After a courtship period, from February to early March, the pair started to incubate on 16 March, but 2 d later a strong wind dislodged the nest. The pair stayed one more day at the power pole, but stopped incubating.

Failed breeding attempts may reduce site or mate fidelity in subsequent breeding seasons (Newton 1979, Population ecology of raptors, Buteo Books, Vermillion, SD U.S.A.). Thus, to encourage site fidelity, we erected an artificial nest on another pylon 150 m away from the original nest 2 d after incubation stopped. The pair occupied the new platform the next day, showing pre-laying behavior until 29 March, when they began incubating a single egg. This egg was sterile or addled, because it had not hatched after more than 60 d of incubation, which was >15 d more than the maximum documented incubation period for Osprey (mean = 39 d, range 35–43 d, Poole 1989).

Because our objective was to encourage successful breeding behavior by the pair, and because we knew definitively that the natural attempt had failed, we decided to translocate two Osprey chicks from a demographically secure population to be fostered by the pair before this breeding attempt was definitively abandoned. Before proceeding, we had to ensure that the pair would be good foster parents, as they probably had no prior breeding experience. Also, collection and transportation of the young from the donor country would take several days. Consequently, we decided to use temporary cross-fostering by placing a chick of another non-endangered species in the nest.

Cross-fostering is a manipulative technique that has been employed in many bird species including several birds of prey (Bird et al. 1985, International Council for Bird Preservation, Technical Publication No. 5:433–438; Cade and Temple 1994, *Ibis* 137:161–172). Although not recommended as a primary method in management programs for species recovery because of potentially contradictory results (Slagsvold et al. 2002, *Proc. R. Soc. Lond.* 269:1449–1455), cross-fostering has proved to be a useful supplementary technique in both long term and temporary situations (Bird et al. 1985; Barclay 1987 *in* B.G. Pendleton et al. [EDS.], Raptor management techniques manual, Natl. Wildl. Fed., Washington, DC U.S.A.). In this case, the selected cross-fostered species was the Black Kite (*Milvus migrans*) which is abundant in the area, is similar in size to an Osprey, and can feed on fish. This was the first known cross-fostering attempt with Osprey and Black Kite. On 25 May we translocated one 12 d old Black Kite from a nest with three chicks to the artificial Osprey nest, leaving the single egg laid by the Ospreys as a further attraction. At first the Ospreys displayed alarm behaviors, flying over the nest and calling, but after 1.7 hr, they landed on the nest. The male returned 1 hr later with a fish and the female fed the Black Kite chick. We monitored the nest during the next days to ensure the parental behavior of the pair continued appropriately.

After the cross-fostering proved successful, we began the fostering experiment. Two Osprey chicks, 12 and 15 d old, were collected from a nest with traditionally low productivity due to human disturbance in NE Germany, which supports one of the most successful breeding populations in Europe (Schmidt 2001, *Vögelwelt* 122:117–128). These chicks were translocated to the nest in Cádiz on 7 June. We substituted the Osprey chicks for the Black Kite and the addled egg, and left two fish in the nest as well. The adult Ospreys landed on the nest and started to feed both chicks just 33 min after the chicks had been introduced. The Black Kite was apparently in good condition and was returned to its natal nest.

During the subsequent weeks, the Osprey nest was monitored to ensure adequate development of the chicks and to prevent human disturbance. Before fledging, the Osprey chicks were measured, weighed, and ringed, and blood samples were collected. Both were equipped with conventional VHF tail-mounted transmitters to allow us to track movements during the post-fledging period, and a satellite PTT was mounted on the larger chick so we could monitor migration. In mid-July both juveniles fledged at 53 and 55 d old, within the age range recorded in migratory populations of Osprey (Poole 1989). During the post-fledging period the young Ospreys improved their flight skills and attempted fishing, although we could not confirm any successful captures. Movements were all within 1500 m of the nest and both parents, especially the male, provided fish for both juveniles.

In early September, both young left the reservoir and started their migration to wintering grounds in Africa, 48 and 47 d after fledging. This was approximately 15 d more than the average post-fledging period recorded in other European populations although within the upper range limit (Bustamante 1995, *Bird Study* 42:31–36). The final destination of the bird with the PTT was a typical Osprey wintering ground in the Gambia River basin of Senegal. It reached the wintering area almost 19 d after departing its natal site, with an average speed of 148 km/d, which is within the range recorded for other Ospreys (Kjellén et al. 2001, *J. Avian Biol.* 32:57–67).

After the juveniles departed, the adult Ospreys stayed all winter in the vicinity of the breeding area, which is typical for other Osprey populations of southern Europe (Poole 1989, Thibault et al. 1995, *J. Raptor Res.* 29:204–207).

Conspecific attraction is potentially important as part of the process of habitat selection in territorial or non-colonial birds (Ahlering and Faaborg 2006, *Auk* 123:301–312). If the increased breeding activity recorded after the start of the reintroduction program was not coincidental, then the presence of young released Ospreys may have influenced the decision made by the non-released birds to breed at this location. This has implications for future management of Osprey breeding populations.

For conservation of threatened species, techniques like temporary cross-fostering can be appropriate and useful under certain conditions, and thus should be considered as potential tools in conservation programs. During spring 2006, a new breeding attempt by the Osprey pair in the reservoir of Cádiz was confirmed. Thus, techniques such as cross-fostering, fostering, and habitat management have contributed to the successful settlement of the first breeding pair of Ospreys in mainland Spain after an absence of 25 yr. Because of our results, cross-fostering and fostering techniques will continue being used in the Osprey reintroduction project, but only as emergency tools to ensure successful breeding attempts of those pairs with problems in the early stages of the breeding cycle.

We thank the Brandenburg State Bird Conservation Dept. for the supply of Osprey nestlings and in particular Torsten Langgemach and Paul Sömmer for making possible the collection and translocation of the chicks from Germany. We also thank Philip Whitfield, James E. Woodford, Mark Martell and an anonymous referee for reviewing early drafts of this letter. This study was supported by G.I.A.S.A. and Junta de Andalucía, and by a pre-doctoral grant F.P.U. from Ministerio de Educación y Ciencia.—**Roberto Muriel (e-mail address: muriel@ebd.csic.es), Miguel Ferrer, and Eva Casado, Department of Biodiversity Conservation, C.S.I.C., Avd. Mª Luisa s/n 41013, Sevilla, Spain; and Daniel Schmidt, NABU-Centre for Bird Protection Mössingen, Ziegelhütte 21, D-72116 Mössingen, Germany.**

Received 27 April 2006; accepted 23 October 2006

J. Raptor Res. 40(4):305–306

A CASE OF A POLYANDROUS TRIO OF EURASIAN BUZZARDS (*BUTEO BUTEO*) ON FUERTEVENTURA ISLAND, CANARY ISLANDS

KEY WORDS: *Eurasian Buzzard*; Buteo buteo; *polyandry*.

Monogamy is the most common mating system in diurnal birds of prey, although cooperative breeding has been described in at least 14% of these species (Kimball et al. 2003, *Auk* 120:717–729). In most instances this was occasional, with the most common form of cooperative breeding being one adult female and two adult males (Kimball et al. 2003).

The Eurasian Buzzard (*Buteo buteo*) is generally considered a monogamous species (Cramp and Simmons 1980, The birds of the western palearctic, Vol. 2, Oxford University Press, Oxford, U.K.; del Hoyo et al. 1992, Handbook of the birds of the world, Vol. 2, Lynx Edicions, Barcelona, Spain) although some slight interactions among adjoining breeding birds have been described (e.g., common aerial meeting points, Cerasoli and Penteriani 1996, *J. Raptor Res.* 30:130–135). We here present the first evidence of cooperative breeding for this species (see review in Kimball et al. 2003). We monitored 31 breeding territories of the unmarked population on Fuerteventura Island (Canary Islands, 28°35′N, 13°58′W) during the 2005 breeding season and we recorded one polyandrous association of one female and two males (determined by size and copulative behavior).

We observed the three hawks in the breeding territory during the six visits we made to the nest from 21 March to 30 April 2005. The three individuals took part in reproductive displays such as courtship flights, landing on the nest and active defense of their territory against Common Ravens (*Corvus corax*). On 1 April the female was incubating and left the nest to copulate with one of the males perched on top of the cliff where the nest was situated. Immediately the other male, perched only 10 m away on the same cliff, flew to the nest and began incubating. The trio incubated four eggs, a relatively large clutch (population mean = 3.00 ± 0.67 (SD), N = 31), until 1 April, at which time only two eggs remained in the nest; we found the remains of the other two in the surrounding area. The incubation of the two remaining eggs continued until approximately 12 April, when the trio finally abandoned the nest with only one egg remaining. We observed the birds in the vicinity of the nest for several more days and the territory was definitively abandoned on 30 April. Although without genetic analyses it was not possible to check paternities, the absence of aggression between males and the habitual presence of three birds in the nest vicinity and at the nest led us to assume that the three hawks formed the breeding unit.

Many hypotheses can explain polyandry phenomena (see review in Kimball et al. 2003), and although further studies are necessary to determine the actual cause, three of these might explain the case presented here. The first is the patchiness of food resources (Kimball et al. 2003). We examined distribution maps of the buzzards' two main prey species [European rabbit (*Oryctolagus cuniculus*) and Barbary ground squirrel (*Atlantoxerus getulus*); Gangoso and López-Darias 2004, Estado de la población de Aguililla (*Buteo buteo insularum*) en Fuerteventura (Islas Canarias), Estación Biológica de Doñana and Cabildo Insular de Fuerteventura, unpubl. report], and found that the higher densities of Buzzards were associated with areas of greater prey abundance (López-Darias unpubl. data); the polyandrous trio association was located in one of the areas with higher densities of buzzard territories. The cooperative breeding trio may provide its members advantages in competing with other nearby pairs. Second, the limited number of suitable breeding territories (e.g., Faaborg 1986, *Ibis* 128:337–347; Heredia and Donázar 1990, *Biol. Conserv.* 53:163–171; Tella 1993, *J. Raptor Res.* 27:119–120), might be another possible explanation. In the last three decades, the buzzard population on Fuerteventura Island has undergone a significant increase from 5–7 breeding pairs to over 100 breeding pairs (Gangoso and López-Darias 2004), and Eurasian Buzzards on Fuerteventura nest primarily on small, interior cliffs, which have limited distribution on the island. Third, the high rate of nest predation by Common Ravens in the area (López-Darias unpubl. data), also documented in other islands (Martín and Lorenzo 2001, *in* F. Lemus [ED.], Aves del Archipiélago Canario, La Laguna, Spain), might result in increased territory defense facilitated by the formation of polyandrous trios.

Thus, the limited nest site availability, the patchy distribution of prey, or the high density of potential nest predators might have led to the establishment of a breeding trio in this resource-rich territory. If so, the subordinate male might be compensated for his cooperation as a secondary male by the possibility of acquiring a resource-rich territory after the death of the dominant male (Faaborg 1986, Heredia and Donázar 1990, Tella 1993).

Although the polyandrous breeding association could have many potential benefits, we note that the reproductive effort of this trio was not successful in this case. Despite the fact that the clutch size was larger than the population mean, the expected higher vigilance and defense capacity did not result in higher productivity.

This research was partially financed by La Caja de Canarias and Cabildo Insular de Fuerteventura. We are also grateful to Cabildo Insular de Fuerteventura for the accommodation provided during the fieldwork, to L. Gangoso for providing useful references, to F. Hiraldo for valuable suggestions on the first draft, and to A. Hansen for checking the English translation. J.D. Ludwig and an anonymous referee provided useful comments to the final version. This work forms part of the doctoral thesis of M. López-Darias, which was funded by the Ministerio de Educacion y Ciencia through an FPU Fellowship (AP20023045). Rafael Barrientos was funded by the Ministerio de Ciencia y Tecnología through an FPI Fellowship (BES-2003-0189) within the framework of the project REN2002-00169.—**Rafael Barrientos, Department of Functional and Evolutionary Ecology, Estación Experimental de Zonas Áridas (CSIC), General Segura 1, E-04001, Almería, Spain; and Marta López-Darias (mdarias@ipna.csic.es, mdarias@ull.es), Department of Applied Biology, Estación Biológica de Doñana (CSIC), Pabellón del Perú, Avda. María Luisa s/n, E-41013, Seville, Spain and Island Ecology and Evolution Research Group, Instituto de Productos Naturales y Agrobiología (CSIC), Avda. Astrofísico Fco. Sánchez 3, E-38206 La Laguna, Tenerife, Canary Islands, Spain.**

Received 25 June 2006; accepted 14 September 2006
Associate Editor: Michael I. Goldstein

J. Raptor Res. 40(4):306–307

Bald Eagles Nest Successfully on Osprey Platform

KEY WORDS: *Bald Eagle*; Haliaeetus leucocephalus; *nest*; *platform*.

Bald Eagles (*Haliaeetus leucocephalus*) have been known to nest rarely on human-made structures (Postupalsky 1978 *in* S.A. Temple [ED.], Endangered birds: management techniques for preserving threatened species, Univ. of Wisconsin Press, Madison, WI U.S.A.; Grubb 1983, *Raptor Res.* 17:114–121). In the spring of 2005 a pair of Bald Eagles nested successfully on a 1.4 × 1.4 m nest platform atop a 27 m utility pole constructed in 2001. It was one of two extraordinarily tall poles erected on Reliant Resources electrical power station along the Delaware River at Portland, Pennsylvania. This was a mitigation measure designed to benefit nesting Ospreys (*Pandion haliaetus*). The power company planned to build several gas turbines in close proximity to a well-established nest pole occupied since 1986. The 440 ha coal-fired power station was chosen in 1982 as a secure Osprey hacking study area. Subsequently, the region around the power plant became home to one of the first hacked Osprey populations, and more than 120 young were fledged there from 1986–2005 (Rymon 1989, *in* R.D. Chancellor [ED.], Raptors in the modern world, World Working Group on Birds of Prey and Owls, Berlin, Germany).

The purpose for erecting such tall poles was to exceed the height of the surrounding tree canopy and the previously constructed 15 m nest poles located near the disturbance area. A pair of Ospreys occupied one 27 m nest platform during 2002–04, and fledged an average of two young/yr. During the winters of 2003–04 and 2004–05, a pair of Bald Eagles was observed perching on the same high nest platform. They also utilized it as a night roost during periods when they were foraging locally. Stick carrying, courtship behavior, and nest reconstruction were noted in February of 2005. Incubation began in early March. We observed two eaglets approximately 2 wk old on the nest on 21 April 2005. During the period leading up to fledging, eaglet activity leveled the small nest and by 17 June just a few original sticks, nailed there to attract Osprey, remained (Fig. 1). The nestlings fledged between 17 and 19 June and returned to the platform for a 2 wk period, during which they were provisioned by the adults. They remained on or near the platform until 16 July when they and the adults began to forage along the Delaware River. Very little territorial aggression between resident Ospreys and Bald Eagles was observed. The Ospreys merely relocated to a nest platform on one of the 15 m nest poles.

The adult Bald Eagles were not banded, but might have been the same pair that nested 2.5 km downstream from the tall nest pole during the 2004 breeding season. That nest was built on an abandoned raptor nest approximately 23 m aboveground in a tulip poplar (*Liriodendron tulipifera*) on a forested slope above the Delaware River, and was unoccupied in 2005. The next-nearest Bald Eagle nest was approximately 20 km away.

Ospreys have habituated well to human activity near the power station, as evidenced by their nesting on the very tall pole only 200 m from a coal delivery train track and parallel highway. Bald Eagles nesting in such a location was considered to be an unlikely event. However, the number of wintering and breeding Bald Eagles have increased in Pennsylvania, as elsewhere. Since 1968, when only one or two wintering eagles were recorded along the Delaware River

Figure 1. Bald Eagles nesting on Osprey platform in Pennsylvania, 2005. Photo © Keith R. Frerichs.

(Rymon unpubl. data), the population there has increased to over 200 wintering birds, many of which are also year-round residents (Pennsylvania Game Commission unpubl. data; Nye 1989, *in* B.G. Pendleton [ED.], Proceedings of the northeast raptor management symposium and workshop, Natl. Wildl. Fed., Washington, DC U.S.A.). More research is needed to determine if this population will show further signs of nesting adaptation on human-made structures.

We thank Brian Hardiman, Meesing Nature Center, and Tiffany Hardiman, for their field observations, Bradley Kreider, Wildlife Conservation Officer, Pennsylvania Game Commission, Dave Yosh and Bill Baker, Reliant Resources, Local Boy Scout Troop 37, and Keith Frerichs, Photographer.

Addendum: During winter 2005–06 and spring 2006, a pair of Bald Eagles, presumably the same birds, perched frequently on the nest platform and then occupied an abandoned raptor nest in a 20 m white pine (*Pinus strobus*) on power station property less than 1 km from the tall nest pole, where they fledged two young.—**Larry Rymon (e-mail address: docnbarb@olypen.com), 214 Timberline Drive, Sequim, WA 98382 U.S.A.; and Ed and Judy Henckel, 1752 Robin Hood Rd., Mt. Bethel, PA 18343 U.S.A.**

Received 16 November 2005; accepted 2 August 2006
Associate Editor: James C. Bednarz