



## Short communication

# First record of a communal roost of Short-toed Eagles *Circaetus gallicus*

ANTONIO-ROMÁN. MUÑOZ,<sup>1\*</sup> BERT TOXOP-EUS,<sup>2</sup> JAVIER ELORRIAGA,<sup>1</sup> JUAN-MIGUEL GONZALEZ<sup>1</sup> & BEATRIZ YÁÑEZ<sup>1</sup>

<sup>1</sup>Fundación MIGRES, N-340, Km. 96 Huerta Grande, Pelayo. E-11390 Algeciras, Spain

<sup>2</sup>International Institute for Geo-Information Science and Earth Observation (ITC), Hengelosestraat 99, PO Box 6, Enschede 7500 AA, Enschede, The Netherlands

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Communal roosting and its adaptive function for birds have been widely studied (e.g. Allen & Young 1982). Both juveniles and adults of social bird species normally concentrate in communal roosts, and the protection of these sites may be of conservation importance. Several examples of communal roosts in raptors have been described, e.g. Bald Eagles *Haliaeetus leucocephalus* in the USA (Riley *et al.* 1983), Egyptian Vultures *Neophron percnopterus* in northern Spain (Donazar *et al.* 1996, Margalida 1997), Lesser Kestrels *Falco naumanni* and African Swallow-tailed Kites *Chelictinia riocourii* in Senegal, where single roosts may contain over 28 600 and 16 000 individuals, respectively (Philippe Pilard, pers. comm.), and many species of harrier (Gurr 1968, Bildstein 1979, Ganesh & Kanniah 2000).

The Short-toed Eagle *Circaetus gallicus* is a migratory, medium-sized tree-nesting raptor whose breeding range in the Western Palaearctic extends from northwest Africa and Iberia through central and southern France, extending northeastward through eastern Poland and the Baltic States and into the Middle East (Snow & Perrins 1998). The western populations winter almost exclusively in a band across the Sahel and the savannah of sub-Saharan Africa north of the Equator (Ferguson-Lees & Christie 2001). Martínez and Sánchez-Zapata (1999) described the wintering of the species in Spain in very small numbers, some individuals wintering regularly during the present decade in southern Spain (Muñoz 2008). It is not gregarious and occurs usually singly or in pairs,

although there are records of up to 12 birds in a flock during migration (Snow & Perrins 1998). In our study area in southern Spain, flocks of up to 37 birds can be seen in the same updraft during autumn migration, usually with other soaring migrants. During autumn migration, birds in Italy generally fly in small separate flocks of up to seven individuals (Agostini *et al.* 2002).

Communal roosts of Short-toed Eagles have not been reported either in the African winter quarters or during migration. This is the first description of a communal roost of Short-toed Eagles, and suggests that communal roosting might occur even in comparatively solitary species.

## STUDY AREA AND METHODS

The Strait of Gibraltar separates southernmost Spain from northernmost Morocco (35°45' to 36°10'N and 5°10' to 6°00'W) and is the shortest sea crossing between Europe and Africa, acting as a major concentration point for soaring migrants (Bijlsma 1987). During migration across the Mediterranean, the largest concentrations of Short-toed Eagles have been observed at the Strait of Gibraltar, both in autumn and in spring (Bernis 1980, Finlayson 1992).

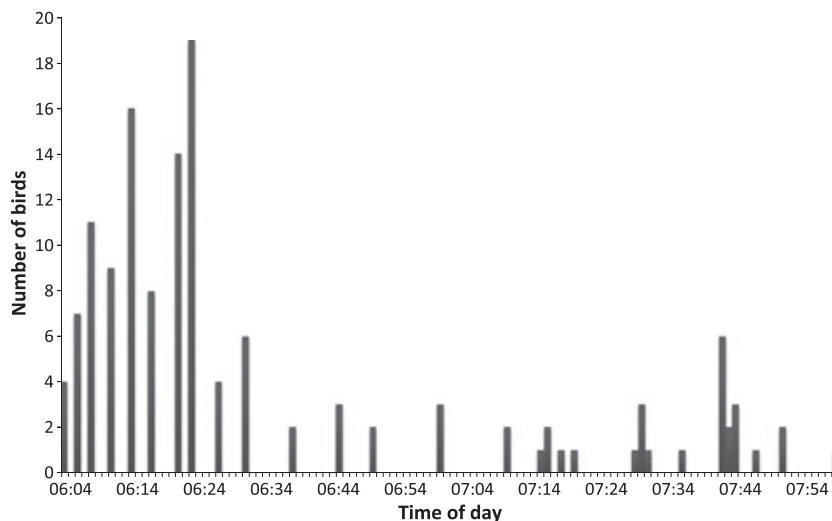
The observations on roosting were made during the spring migration in 2009 in a small valley orientated NE–SW in the surroundings of del Estrecho Natural Park (Cadiz, southern Spain), at 160 m asl, 5.5 km from the coastline. The area is covered by wild Olive *Olea europaea* var. *sylvestris* and Cork Oak *Quercus suber* woodland with small patches of scrub and rocky areas.

## RESULTS

During spring migration, we first noted a concentration of Short-toed Eagles near dusk on 17 March, when 24 birds were seen perching in a number of trees. During the morning of 18 March, up to 19 birds were seen simultaneously, presumably hunting, in the near vicinity of the same valley. At dusk on 18 March, we confirmed the presence of a communal roost, with a minimum of 50 Eagles. At dawn of the following day, 139 Short-toed Eagles were counted leaving the roost, with most departing between 06:00 and 08:00 h (UTC) (Fig. 1). The first four eagles took off together at 06:04 h, just after sunrise and 45 min later 75% of the birds had already left the area, mostly in small groups. By 07:59 h all but three of the birds had left the roost.

Twenty-one groups of birds were observed leaving the roost with an average of  $4.7 \pm 4.8$  (sd) birds per group, as well as eight (5.9% of all) single individuals. Once the birds started flying, they immediately disappeared northwards. All the birds perched for the night in trees on the wind-protected side of the valley. The roost was located in a forested area of c. 1 ha. Most of the

\*Corresponding author.  
Email: roman@fundacionmigres.org



**Figure 1.** Time (UTC) at which the Short-toed Eagles left the roost ( $n = 136$ , three birds remained in the roost at the end of the observation).

birds perched in wild Olive trees close to each other (from 1 to 2 m), with a maximum of seven eagles seen in a dry Cork Oak. In this area the average height of the trees is between 4 and 6 m. On 20 and 21 March, all Short-toed Eagles had left the area except the local breeding pair. No aggressive intraspecific interactions were observed. The area was visited regularly in the days following the first observations and we did not register any concentration of birds.

## DISCUSSION

Although field evidence suggests that almost all species of migratory raptors join together in groups at least occasionally while migrating (Bildstein 2006), communal roosting during migration has been described for only a few species. This unusual roosting behaviour of Short-toed Eagles was probably due to adverse weather conditions, with strong easterly winds (7–9 on the Beaufort scale) and rainfall from 13 to 19 March. The roost was located in a hillside shielded from the strong wind, and the Eagles only perched in the outer branches of the trees in the first instance, settling in the central branches later. After this week of poor weather, March 19 was the first day with only moderate winds (3–4 on the Beaufort scale), allowing the Eagles to continue spring migration. To reduce the energetic costs of flight, most birds use tailwinds for migration and are less likely to migrate when they have to fly into strong winds or when precipitation is heavy (Richardson 1990, Erni *et al.* 2002). In the case of migratory soaring birds, migrating primarily by day and depending more heavily on thermals (Newton 2008), meteorological conditions may be crucial. The daily distance covered by birds during migration

may vary considerably according to the atmospheric conditions, comprising hundreds of kilometres per day during favourable weather conditions, and very small distances (sometimes < 20 km or even ceasing migration) on days with bad weather (Cochran 1975, Meyburg *et al.* 1998, Green *et al.* 2002).

Under conditions of moderate wind, the Short-toed Eagle normally crosses the Strait of Gibraltar using the shortest crossing distance, thus reducing energy consumption during the sea crossing. Once the birds reach the northern coast of the Strait they typically continue their flight without landing and without being concentrated. The crossing behaviour of soaring birds in the Strait of Gibraltar depends mainly on the prevailing wind direction: the birds converge on the eastern end of the Strait under westerly winds and on the western end under easterly winds (Bernis 1980). As expected with the prevailing weather conditions during the observation period, the migratory Short-toed Eagles were concentrated in the western part of the Strait due to the persistent easterly wind. The birds probably drifted with the strong wind, in spite of the raptors' usual tendency to compensate for negative wind components (Spaar & Bruderer 1996), and once in this area they selected a valley protected from the wind to form a communal roost. The fact that the birds stayed together indicated a choice to do so, and was not because they were forced to do so by a shortage of roosting trees as many available trees were unoccupied.

This roosting behaviour may have social implications (Rabenold 1986, Parker *et al.* 1995). Birds from a wide range may congregate, encouraging pair formation and mate replacement, as described by Donazar *et al.* (1996) for the Egyptian Vulture. During pre-nuptial migration,

just before the start of the breeding season, communal roosting could facilitate the exchange of individuals among different geographical areas with implications in the regulation and viability of populations.

The communal roosting site found in the Strait of Gibraltar is the largest ever reported for the Short-toed Eagle. The Strait of Gibraltar constitutes a major bottleneck for migrating soaring birds in the Mediterranean and the high frequency of adverse weather conditions in the area, which force raptors and other soaring birds to land and stop for several days, may make the identification and protection of those areas where birds concentrate a significant conservation issue.

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