First long-distance movement of a Tengmalm's Owl *Aegolius funereus* recorded in the Pyrenees, Spain

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We report the first-ever record of a long-distance movement of a Tengmalm's Owl ringed in the Pyrenees. During a study of the species in Catalonia, a female Tengmalm's Owl that had been ringed in Sahun (Huesca) was captured 333 days later and 156 km away in Setcases (Girona). At both sites the female was found to be breeding in a nest hole. The first record of a nomadic movement of a breeding female in the Pyrenees is described, although this type of movement does appear to be common in more northerly populations. This finding also suggests that Tengmalm's Owl populations may be relatively well interconnected throughout the species' range in the Pyrenees.

Key words: Tengmalm's Owl, *Aegolius funereus*, long-distance recovery, nomadic movement, Pyrenees.

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Tengmalm's Owl *Aegolius funereus* is a small nocturnal hole-nesting bird of prey that lives in the boreal forests of Eurasia (Mikkola 1983) and North America (Hayward & Hayward 1993). The habits and movements of this species are well known in the north of its European and North American ranges (Lofgren *et al.* 1986, Korpimäki 1986, 1987, Korpimäki *et al.* 1987, Sonerud *et al.* 1988, Hayward *et al.* 1993), as well as in Central Europe (Franz *et al.* 1984, Schwerdtfeger 1984, Korpimäki 1986, Moeckel 1996).

In the Pyrenees, the few published studies on Tengmalm's Owl essentially describe the main patterns of habitat selection and it distribution (Alamany & Ticó 1983, Mariné & Dalmau 2000a, Mariné *et al.* 2003, Dalmau-Ausàs & Mariné 2004); nothing, however, is known about this species' migratory and post-breeding movements. The Pyrenean population was not known to exist until a nest was found on the French side of this mountain chain in 1963 (van der Vloet 1964); the species was then first detected on the Spanish side in 1983 (Alamany & Ticó 1983, 1984).

In this paper, we describe the first recorded long-distance movement of an adult female Tengmalm's Owl over two consecutive breeding seasons in the Pyrenees and compare this movement with those that regularly take place in more northern populations. We then discuss the relevance of this finding in the context of the management and monitoring of the species.

Tengmalm's Owl is the object of study in the south-east Pyrenees (the Principality of Andorra and Catalonia) and since 2005 the species' breeding parameters and population trends have been monitored. In Catalonia survey work covers the *comarques* (counties) of Cerdanya, Ripollès and Alt Urgell, an area in which Tengmalm's Owl inhabits subalpine forests dominated by Scots pine *Pinus sylvestris*, moun-

tain pine *Pinus uncinata* and European silver fir *Abies alba* (Alamany & Ticó 1983, Mariné *et al.* 2003, Dalmau-Ausàs & Mariné 2004, Bonada *et al.* 2005) at altitudes between 1,600 to 2200 m a.s.l.(Bonada *et al.* 2005).

In order to locate nest sites and delimit territories males were detected by listening activities undertaken during March and April, the months of year in which males call most actively (Mikkola 1983). Surveys were carried out at around nightfall in known territories or in places with favourable habitat. On some occasions, tapes were used to stimulate male response. Since singing is influenced by temperature, wind and rainfall, listening activities were only carried out on nights of high atmospheric pressure.

During 2005, 39 territories were surveyed (total of 2985 ha) and a total of 84 listening activities were carried out in Catalonia. Males were only detected at 14 sites. During the same year, 10 territories were visited in Andorra and 21 listening activities were carried out, with a total of seven males recorded. During 2006, only Catalonia was surveyed and 15 territories (covering 883·8 ha) were visited and 30 listening activities undertaken, with a result of only two males detected.

During both 2005 and 2006, 85 nest boxes were checked in the two survey areas (Catalonia and Andorra). When breeding was detected in a nest box, females were captured on the nest with the aid of a conical net with an 11-m long handle.

In 2005, three nests were found in Catalonia and four in Andorra: two females were ringed in Catalonia, and three females and three chicks in Andorra. In 2006, nine nests were found in Catalonia: seven females and 13 chicks were ringed. One of the trapped females had been ringed in Sahun (EURING age-code 4; ICONA/Madrid ring 5071168), Aragon (42°36'N, 00°27'E) a year before (22 June 2005) when it was detected 333 days later (25 May 2006) breeding in Setcases, Girona (42°25', 00°15'E), 156 km away from Sahun (Figure 1). This female was assigned EURING age-code 8.

In 2005, this female was found breeding in a natural hole in a silver fir and had laid four eggs, while in 2006, she was breeding in a natural hole in a mountain pine and had laid three eggs. Both nesting holes had been made by a Black Woodpecker *Dryocopos martius* and apparently both clutches were subsequently predated by Pine Martens *Martes martes*.

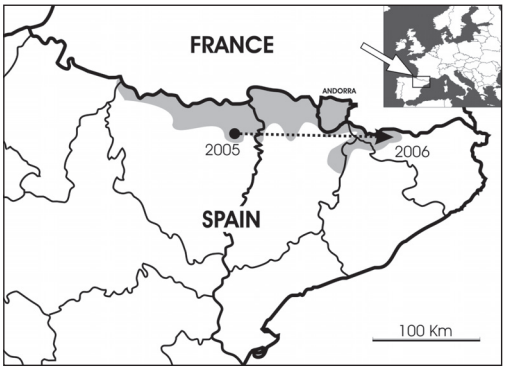

Figure 1. Movement made by female 5071168 between two consecutive breeding seasons, 2005 and 2006. Shaded area shows the known breeding distribution of Tengmalm's Owl in Spain and Andorra.
Moviment efectuat per la femella 5071168 entre dues estacions de cria, 2005 i 2006. L'àrea ombrejada fa referència a la distribució de cria coneguda del Mussol Pirinenc a Espanya i Andorra.

This recovery is the first for Tengmalm's Owl in the Spanish Pyrenees (Frías *et al.* 2005). Between 1973 and 2004, only 73 Tengmalm's Owls were ringed in Spain (Frías *et al.* 2005) and over the last two years only 18 females have been ringed in Spain and Andorra. Of these 91 ringed birds only one has ever been recovered.

There is one previous – although somewhat doubtful – record that may correspond to another movement of an adult female of this species. A female was tagged with a radio transmitter in May 1999. A few weeks later the transmitter stopped working, but by chance in March 2000 was found on the forest floor 16 km away from where the female was originally tagged (Mariné & Dalmau 2000b). It is impossible to know whether or not the transmitter reached it final destination as a result of a movement by the female or due to another unknown reason.

The long-distance movement of female 5071168 suggests that this Tengmalm's Owl population may in fact be quite well interconnected within Spain on a Pyrenean scale. Indeed, the movement of this particular female embraces almost the whole east-west length of the species' known breeding distribution (Figure 1).

Movements of up to 156 km have been reported in nomadic females from countries such as Norway (Sonerud *et al.* 1988), Finland (Korpimäki *et al.* 1987, Saurola & Francis 2004), Sweden (Löfgren *et al.* 1986), Germany (Franz *et al.* 1984) and Austria (Schwerdtfeger 1984), as well as in North America (Hayward *et al.* 1993). These results suggest that female Tengmalm's Owls carry out important nomadic breeding movements in a number of different regions (Cramp 1985, Lofgren *et al.* 1986, Korpimäki 1987, Korpimäki *et al.* 1987, Mikkola 1995, Hayward *et al.* 1993, Hipkiss 2002, Hipkiss *et al.* 2002, Saurola & Francis 2004); the breeding dispersal of the female reported in this study adds further weight to this hypothesis. While male Tengmalm's Owls are faithful to their breeding territories after their first breeding attempts (Korpimäki 1992), females disperse widely after each breeding attempt and pairs only breed together once (Korpimäki 1993). Adult females disperse further after nest predation than after successful nesting (Sonerud *et al.* 1988). This course of action may explain the movements of the female reported here after her nest had been predated by Pine Martens in two consecutive breeding seasons.

Breeding males are site-tenacious during and between peaks in cycles in its staple food (voles); females, on the other hand, are only site-tenacious during peaks (Löfgren *et al.* 1986). In the Pyrenees no evidence exists for these cyclical peaks that are so typical of boreal areas (Blanco 1998). A few unpredictable annual fluctuations in prey species have been described (Comas & Raspall 1997, Blanco 1998) and probably female Tengmalm's Owls in the Pyrenees move to areas to breed where small mammals are more abundant.

Finally, our results suggest that the Tengmalm's Owl population in the Pyrenees may be relatively well connected and so common conservation strategies for this species should be implemented by all the competent administrations in the region.

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Resum

Primer moviment llunyà d'un Mussol Pirinenc *Aegolius funereus* als Pirineus

Durant el seguiment de la població de Mussol Pirinenc a Catalunya, s'ha produït la primera recuperació llunyana d'aquesta espècie als Pirineus. Aquest és el cas d'una femella recuperada a Setcases, Girona (42°25'N, 00°15'E), la qual havia estat anellada a Sahún, Osca (42°36'N, 00°27'E), 333 dies abans, i després d'haver recorregut 156 km. Aquesta femella va ser anellada com a nidificant a Sahún i recuperada també criant a Setcases. Per primera vegada es constata el moviment nòmada d'una femella reproductora als Pirineus, molt típic en d'altres poblacions nòrdiques i més estudiades que la pirenaica, una de les més meridionals d'Europa. A més, demostra que la població pirenaica està comunicada d'oest a est, pel que se suggereix que la gestió d'aquesta espècie als Pirineus s'ha de realitzar en conjunt i no per separat per cada administració competent.

Resumen

Primer movimiento lejano de un Mochuelo Boreal *Aegolius funereus* en los Pirineos

Durante el seguimiento de la población de Mochuelo Boreal en Cataluña, se ha realizado la primera recuperación lejana de esta especie en los Pirineos. Es el caso de una hembra recuperada en Setcases, Girona (42°25'N, 00°15'E), que había sido anillada en Sahún, Huesca (42°36'N, 00°27'E), 333 días antes, habiendo recorrido 156 km. Esta hembra fue anillada criando en su nido en Sahún y recuperada criando también en Setcases. Por primera vez se constata el movimiento nómada de una hembra reproductora en los Pirineos, muy típico en otras poblaciones nórdicas y más estudiadas que la pirenaica, y una de las más meridionales d'Europa. Además, demuestra que la población pirenaica está comunicada de oeste a este, y sugiere que la gestión de está

especie en los Pirineos tiene que realizarse en su conjunto y no por separado por cada administración competente.

References

Alamany, O. & Ticó, J.R. 1983. Mussol de Tengmalm *Aegolius funereus*. In Muntaner, J. Ferrer, X. & Martínez-Vilalta, A (eds.): *Atlas dels ocells nidificants de Catalunya i Andorra*. Pp.138–140. Barcelona: Ketres.

Alamany, O. & Ticó, J.R. 1984. Primera observación de Lechuza de Tengmalm en la Península Ibérica. *Quercus* 13: 27–28.

Alamany, O. & Muntané, O. 1997. Lechuza de Tengmalm (*Aegolius funereus*). In Purroy, F. J. (coord.): Atlas de las aves de España (1975-1995). Pp. 268–269. Barcelona: SEO-BirdLife / Lynx.

Blanco, J.C. 1998. *Mamíferos de España.* Vol II. Barcelona: Planeta.

Bonada, A., López, A., Saló, R., Potrony, D. & Badosa, E. 2005. *Seguiment del Mussol pirinenc a Catalunya.* Barcelona: Generalitat de Catalunya, Departament de Mediambient.

Comas, L. & Raspall, A. 1997. *Seguiment interanual de les poblacions de rosegadors al Parc Nacional d'Aigüestortes i Estany de Sant Maurici.* Llibre de les IV Jornades sobre recerca al Parc Nacional d'Aigüestortes i E. de St. Maurici.

Cramp, S. (ed.). 1985. *The Birds of the Western Palearctic.* Volum IV. Oxford: Oxford University Press.

Dalmau-Ausàs, J. & Mariné, R. 2004. Mussol pirinenc *Aegolius funereus*. In Estrada, J., Pedrocchi, V., Brotons, L. & Herrando, S. (eds.): *Atles dels ocells nidificants de Catalunya 1999-2002.* Pp. 296–297. Barcelona: Lynx.

Franz, A. Mebs, T. & Seibt, E. 1984. Several aspects of population biology in the Tengmalm's Owl *Aegolius funereus* in Southern Westphalia (West Germany) and adjacent areas on the base of ringing results. *Vogelwarte* 32 (4): 260–269.

Frías, O., Escudero, E., Serradilla, A.I., Pinilla, J. & Moreno-Opo, R. 2005. Informe de actividades de la Central de Anillamiento de Aves ICONA. Año 2003-2004. *Ecología* 19: 185–278.

Hayward,G. D. Hayward, P.H. & Garton, E.1993. Ecology of boreal owls in the northern Rocky Mountains, USA. *Wildlife Monogr.* 124: 1–59.

Hayward, G.D. & Hayward, P.H. 1993 Boreal owl *Aegolius funereus*. In Poole, A. & Gill, F. (eds.): *The Birds of North America*. Pp. 1–19. Philadelphia: The Academy of Natural Sciences and the American Ornithologist's Union.

Hipkiss, T. 2002. Sexual size dimorphism in Tengmalm's owl (*Aegolius funereus*) on autumn migration. *J. Zool.* 257: 281–285.

Hipkiss, T., Hörnfeldt, B., Lundmark, A., Norbäck, M. & Ellegren, H. 2002. Sex ratio and age structure of nomadic Tengmalm's owls: A molecular approach. *J. Avian Biol.* 33 (1): 107–110.

Korpimäki, E. 1981. On the ecology and biology of Tengmalm's owl (*Aegolius funereus*) in southern Ostrobothmia and Suomenselkä, western Finland. *Acta Univ. Ouluensis (Ser. A. Sci. Rerum Nat.)*118: 1–84.

Korpimäki, E. 1986. Gradients in population fluctuations of Tengmalm's owl *Aegolius funereus* in Europe. *Oecologia* 69: 195–201.

Korpimäki, E. 1987 Selection for nest-hole shift and tactics of breeding dispersal in Tengmalm's owl *Aegolius funereus*. *J. Anim. Ecol.* 56 (1): 185–196.

Korpimäki, E. 1992 Fluctuating food abundance determines the lifetime reproductive success of male Tengmalm's owls. *J. Anim. Ecol.* 61: 103–111.

Korpimäki, E. 1993 Does nest-hole quality, poor breeding success or food depletion drive the breeding dispersal of Tengmalm's Owls? *J. Anim. Ecol.* 62: 606–613.

Korpimäki, E., Lagerstrom, M & Saurola, P. 1987. Field evidence for nomadism in Tengmalm's owl *Aegolius funereus*. *Ornis Scand.* 18 (1): 1–4.

Löfgren, O., Hörnfeldt, B. & Carlsson, B. G. 1986. Site tenacity and nomadism in Tengmalm's owl *Aegolius funereus* in relation to cyclic food production. *Oecologia* 69 (3): 321–326.

Mariné, R. & Dalmau, J. 2000a. Uso del hábitat por el mochuelo boreal *Aegolius funereus* en Andorra (Pirineo oriental) durante el periodo reproductor. *Ardeola* 47 (1): 29–36.

Mariné, R. & Dalmau, J. 2000b. *Estudi del mussol pirinenc*. Departament de Medi Ambient del Govern d'Andorra.

Mariné, R., Lorente, L., Dalmau, J. & Bonada, A. 2003. Mochuelo Boreal *Aegolius funereus*. In Martí, R & del Moral, J.C. (eds.): *Atlas de las aves reproductoras de España.* Pp. 326–327. Madrid: Dirección General de Conservación de la Naturaleza-SEO.

Mikkola, H. 1983. *Owls of Europe.* Calton: Poyser.

Moeckel, R. 1996. Range expansion of Tengmalm's Owl *Aegolius funereus* in eastern Germany. *Vogelwelt* 117 (2): 57–66.

Saurola, P & Francis, M. 2004. Estimating population dynamics and dispersal distances of owls from nationally coordinated ringing data in Finland. *Anim. Biodiv. Conserv.* 27 (1): 403–415.

Schwerdtfeger, O. 1984. Behavior and population dynamics of Tengmalm's owl *Aegolius funereus*. *Vogelwarte* 32 (3): 183–200.

Sonerud, G. A. Solheim, R. & Prestrud, K. 1988. Dispersal of Tengmalm's owl *Aegolius funereus* in relation to prey availability and nesting success. *Ornis Scand.* 19 (3): 175–181.

van der Vloet, H. 1964. La Chouette de Tengmalm nicheuse dans les Pyrénées Orientales. *L'Oisseau* 34: 69.