

REPORT

ABUNDANCE OF THE EURASIAN OTTER *Lutra lutra* (LINNAEUS, 1758) IN TWO AREAS FROM CENTRAL SPAIN (PROVINCE OF SALAMANCA, RIVER TORMES)

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Abstract: The Eurasian otter (*Lutra lutra*) is a widely distributed species in central Spain. Studies about its occurrence and diet are abundant, but data about population size are scarce. The density of the species was estimated during consecutive winters in two contrasted areas from central Spain by means of track censuses. The KAI index (Kilometrical Abundance Index) varied between 0.14 otters/km in the vicinity of the city of Salamanca and 0.25 otters/km in a conserved area. These results fit well with moderate productivity rivers and are similar to those obtained in other localities from the Mediterranean basin.

Keywords: *Lutra lutra*, population size, track census

INTRODUCTION

The Eurasian otter *Lutra lutra* (Linnaeus, 1758) is nowadays widely distributed in central Spain (Delibes, 1990; Morales et al., 1998; Ruiz-Olmo and Delibes, 1998; Cortés et al., 1998; Palomo et al., 2007), especially in riparian areas with certain water flow. In the last decades an increase and a colonizing pattern in the species range have been registered in this area after a worrying decrease in the central decades of the 20th century (see previous references).

Although a large number of studies about distribution and trophic ecology of the species have been carried out and an extensive monitoring of some otter populations (Delibes, 1990; Morales et al., 1998; Ruiz-Olmo and Delibes, 1998) only one work concerning otter population size has been published in reference to a naturally protected park (Bravo et al., 1998) and thus density remains poorly known.

Data on otter abundance in central Spain are based in defecation rates (Díez-Frontón, 1998; Morales et al., 1998; Pérez-Alonso, 1999) that can be used as an indirect method for estimating population size (Mason and MacDonald, 1987; Ruiz-Olmo et al., 2001a; Guter et al., 2008; Lanzski et al., 2008), but the application of this rate as estimator depends on climatic factors, mainly rainfalls, availability of defecation sites, season of the year and other factors (Conroy et al., 1991; Kranz, 1996; Strachan and Jefferies, 1996; Kruuk, 2006; Ruiz-Olmo et al., 2001a) making this spraint index not always adequate for abundance evaluation purposes.

In this communication some data about abundance and density of the otter in two different areas from central Spain are discussed.

MATERIAL AND METHODS

Fieldwork was carried out in two localities of the river Tormes, one of the major tributaries of the Duero basin, in the province of Salamanca, central Spain (Fig. 1). Herein the occurrence of otter is well known on the basis of large monitoring surveys using spraints but also registered by direct observations from the later 1980s (Delibes, 1990; Ruiz-Olmo and Delibes, 1998; Pérez-Alonso, 1999).

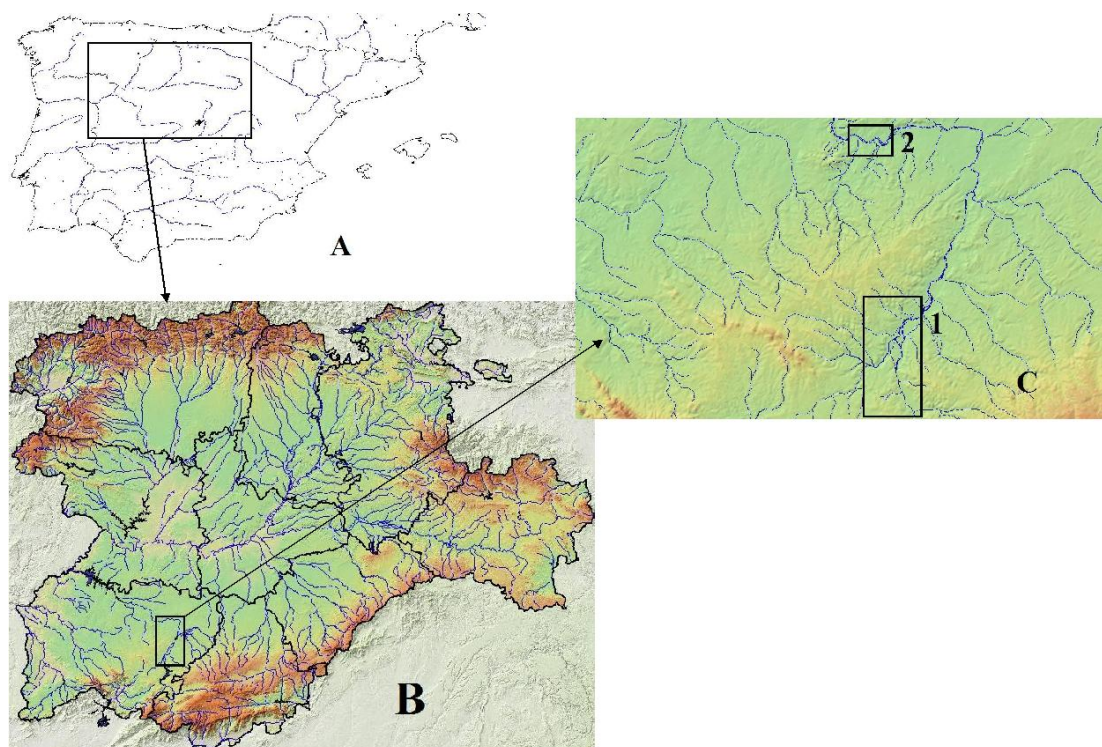


Figure 1. Study area. A. Location on the Iberian Peninsula. B. Digital Elevation Model of the study area. C. Digital Elevation Model and hydrographic web of the two localities surveyed; 1: Santa Teresa dam; 2: Salamanca.

The first set of stretches studied is located downstream from the Santa Teresa dam (GPS coordinates of the medium area point: 30T 280849, 4508295; 820 m. high) in a sedimentary plain intensively used as croplands surrounded by oak forest (*Quercus ilex*), managed with extensive livestock (called “dehesas”). The riparian forest is structured in gallery where *Salix sp.*, *Populus sp.*, *Ulmus sp.* and *Fraxinus sp.* are the dominant species, and with high shrub cover in the inferior strata. Punctually, this forest is removed and replaced for monospecific plantations of *Populus nigra*. The water network is well developed, mainly by the beds of the rivers Tormes and Alhandiga, which drains the flow of numerous rivers and irrigation ditches. Moreover, gravel extraction activities create some new lakes.

The second area studied was in the vicinity of the city of Salamanca situated on the river Tormes and two of its tributaries (GPS coordinates of the medium area point: 30T 276181, 4537213; 800 m.). Here the riparian habitat is largely degraded because of the influence of human pressure on the river due to the population size of the city and recreational activities. Currently the forest is mainly reduced to a series of islands in the middle of the river while banks are used as a “river street” and parks for human activities.

In both territories helophyte vegetation (*Phragmites australis*, *Typha latifolia*) covers up to a 10 % of the water surface, but in some particular situations can reach more than 90 %.

The abundance of the otter in these areas where studied by means of track censuses, a reliable indicator of real otter population in a fixed surface (Sidorovich and Lauzhel, 1992; Reid et al., 1987; Ruiz-Olmo et al., 2001a; Sulkava, 2007; Sulkava and Liuko, 2007).

The banks of all water bodies included in any of the work zones were intensively surveyed from November to February of several consecutive winters (three in the first locality and two in the second) searching for adequate points for track stamp. On the basis of the adequate substrate availability the length surveyed in Santa Teresa was 15.7 kilometers but in Salamanca only seven kilometers were surveyed.

Only those fresh, clear and well-marked tracks on clay substrates were used in the study (Hertweck et al., 1998; Mercier and Fried, 2004). Another signs found were not used for avoiding biases. In those tracks keeping these characteristics the total length including claws were measured with a digital caliper (accurate: ± 1 mm.).

Results are expressed as Minimum Number of different Tracks (MNT) and standardized by using a Kilometrical Abundance Index ($KAI = MNT / \text{length of the stretch surveyed}$).

RESULTS AND DISCUSSION

In the first area studied, three MNTs were registered during the 2004-2005 winter and the winters of 2005-2006 and 2006-2007 registered four consistent MNTs (Table 1). In the city of Salamanca only one MNT was estimated during the two winters of study (Table 2). In both cases the low variation MNT indicates a stable, although small, otter population.

Table 1. Winter censuses of otter downstream of the Santa Teresa dam. MNT: minimum number of different tracks registered. KAI: Kilometrical Abundance Index (MNT / length surveyed).

	Length surveyed (km)	MNT	KAI
2005-2006	15.72	3	0.19
2006-2007	15.72	4	0.25
2007-2008	15.72	4	0.25

KAI: Kilometrical Abundance Index (MNT / length surveyed).

Table 2. Winter censuses of otter in the river Tormes in the city of Salamanca.

	Length surveyed (km)	MNT	KAI
2006-2007	7.00	1	0.14
2007-2008	7.00	1	0.14

KAI: Kilometrical Abundance Index (MNT / length surveyed).

Mean relative abundances (KAI) are higher in the floodplain downstream the Santa Teresa dam (0.23 MNT) than in Salamanca (0.14 MNT), thus reflecting a larger population in the first area than in the second. Probably this can be related to a low habitat quality and productivity of the river Tormes in the vicinity of Salamanca (Mason, 1995; Ruiz-Olmo et al., 2001b) but the scarce sample size does not allows adequate conclusions.

Otter spraints were also found during samplings, consistent with a constant occupation of the stretches.

These short estimated abundances during fieldwork are in agreement with a territorial mammal, which occurs in lineal habitats such as rivers or streams (Kruuk, 2006). The obtained KAI belongs, in the Mediterranean basin, with moderate or intermediate otter densities of the cyprinid dominant area (Ruiz-Olmo, 1995; Ruiz-Olmo et al., 2001a).

These KAI values were similar to those measured in Spain, Mediterranean basin and northern Europe (about 0.20 otters/km; Sidorovich and Lauzhel, 1992; Ruiz-Olmo, 1995; Bravo et al., 1998; Sulkava et al., 2007), high than in central and eastern Europe (Georgiev and Stoycheva, 2006; Kalz et al., 2006; Lanzski et al., 2008), but lower in comparison with some populations from north Scotland, China or Germany where densities higher as 1.66 otters/km are reported (Kruuk et al., 1989; Hung et al., 2004; Kruuk, 2006).

However it is necessary to take into account that the number of otters estimated in winter was less than in summer (Ruiz-Olmo, 1995), although this effect seems to be an effect of the water flow restriction during this season (Prenda et al., 2001), bringing together a large number of otters in areas with available resources.

Anyway, the variability in the length studied in both areas (see Tables 1 and 2) could influence the results obtained and makes comparisons among localities hard to interpret. An appropriate length for surveying otters was estimated as ten kilometers in Spain (Ruiz-Olmo, 1995) but this were not accomplished in Salamanca and the results then should be interpreted cautiously.

Despite the reported increase in otter range in central Spain a need for increasing the knowledge on population size could be important for implementing conservation measures.

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REFERENCES

- Bravo, C., Bueno, F., Sánchez-Aguado, F. (1998).** I Censo visual de nutria (*Lutra lutra*) y visón americano (*Mustela vison*) en el Parque Natural de las Hoces del Duratón (Segovia). *Galemys* **10** (N.E.): 89-96.
- Cortés, Y., Fernández-Salvador, R., García, F.J., Virgos, E., Llorente, M. (1998).** Changes in otter (*Lutra lutra*) distribution in central Spain during the 1984-1995 period. *Biol. Conserv.* **86**: 179-183.
- Conroy, J.W.H., French, D.D. (1991).** Seasonal patterns in the sprinting behaviour of otters (*Lutra lutra* L.) in Shetland. *Habitat* **6**: 159-166.
- Delibes, M. (ed.) (1990).** La nutria (*Lutra lutra*) en España. Serie Técnica, ICONA, Madrid.
- Díez-Frontón, D. (1998).** Ecología trófica, distribución y competencia del visón americano (*Mustela vison*) y la nutria (*Lutra lutra*) en el río Moros, Segovia. Degree Thesis, University of Salamanca, Salamanca.
- Georgiev, D. G., Stoycheva, S. (2006).** Habitats, distribution and population density otter survey in western Rhodopes mountains (Southern Bulgaria). *IUCN Otter Spec. Group Bull.* **23**: 36-43.
- Guter, A., Dolev, A., Saltz, A., Kronfeld-Schor, A. (2008).** Using videotaping to validate the use of sprints as an index of Eurasian otter (*Lutra lutra*) activity. *Ecol. Indic.* **8**: 462-465.
- Hertweck, K., Klenke, R., Henle, K. (1998).** Estimating the density of otter *Lutra lutra* population using individual analysis of tracks. *IUCN Otter Spec. Group Bull.* **19**: 118-122.
- Hung, C.M., Li, S.-H., Lee, L.-L. (2004).** Faecal DNA typing to determinate the abundance and spatial organisation of otter (*Lutra lutra*) along two stream systems in Kinmen. *Anim. Conserv.* **7**: 301-311.
- Kalz, B., Jewgenow, K., Fickel, J. (2006).** Structure of an otter (*Lutra lutra*) population in Germany – results of DNA and hormone analyses from faecal samples. *Mamm. Biol.* **71**: 321-335.
- Kranz, A. (1996).** Variability and seasonality in sprinting behaviour of otters *Lutra lutra* in a highland river in central Europe. *Lutra* **38**: 33-44.
- Kruuk, H. (2006).** Otters. Ecology, behaviour and conservation. Oxford University Press, Cambridge.

- Kruuk, H., Moorhouse, A., Conroy, J.W.H., Durbin, L., Fears, S. (1989).** An estimate of numbers and habitat preferences of otters *Lutra lutra* in Shetland, UK. *Biol. Cons.* **49**: 241-254.
- Lanszki, J., Hidas, A., Szentés, K., Révay, T., Lehoczky, I., Weiss, S. (2008).** Relative spraint density and genetic structure of otter (*Lutra lutra*) along the Drava River in Hungary. *Mamm. Biol.* **73**: 40-47.
- Mason, C.F., MacDonald, S.M. (1987).** The use of spraints for surveying the otter *Lutra lutra* populations: an evaluation. *Biol. Cons.* **41**: 167-177.
- Mason, C.F. (1995).** Habitat quality, water quality and otter distribution. *Hystrix* **7**: 195-207.
- Mercier, L., Fried, G. (2004).** Preliminary study of the tracks of captive otters (*Lutra lutra*) as a tool for field research. *IUCN Otter Spec. Group Bull.* **21**: 94-99.
- Morales, J.J., Lizana, M., Gutiérrez, F.J., Pedraza, E. (1998).** Distribución espacial y ecología trófica de la nutria euroasiática y el visón americano en el Parque Natural de las Hoces del Duratón (Segovia). Colección Naturaleza y Medio Ambiente, Obra Social y Cultural de Caja Segovia, Segovia.
- Palomo, L.J., Gisbert, J., Blanco, J.C. (eds.) (2007).** Atlas y libro rojo de los mamíferos terrestres de España. DGCN-SECEM-SECEMU, Madrid.
- Pérez-Alonso, J.C. (1999).** Distribución y ecología trófica de la nutria (*Lutra lutra* Linneo, 1758) en el río Tormes (Salamanca). Degree Thesis, University of Salamanca, Salamanca.
- Prenda, J., López-Nieves, P., Bravo, R. (2001).** Conservation of otter (*Lutra lutra*) in a Mediterranean area: the importance of habitat quality and temporal variation in water availability. *Aquat. Cons.* **11**: 343-355.
- Reid, D.G., Bayer, M.B., Code, T.E., McLean, B. (1987).** A possible method for estimating river otter, *Lutra canadensis*, populations using snow tracks. *Can. Field Nat.* **101**: 576-580.
- Ruiz-Olmo, J. (1995).** Estudio bionómico sobre la nutria (*Lutra lutra* L., 1758) en aguas continentales de la península Ibérica. Ph. D. Thesis, University of Barcelona, Barcelona.
- Ruiz-Olmo, J., Delibes, M. (eds.) (1998).** La nutria en España ante el horizonte del año 2000. SECEM, Málaga.
- Ruiz-Olmo, J., Saavedra, D., Jiménez, J. (2001a.)** Testing the surveys and visual and track censuses of Eurasian otters (*Lutra lutra*). *J. Zool.* **253**: 359-369.
- Ruiz-Olmo, J., López-Martín, J.M., Palazón, S. (2001b).** The influence of fish abundance on the otter (*Lutra lutra*) populations in Iberian Mediterranean habitats. *J. Zool.* **254**: 325-336.
- Sidorovich, V.E., Lauzhel, G.O. (1992).** Numbers of otters and approach to population estimation in Byelorussia. *IUCN Otter Spec. Group Bull.* **7**: 13-16.
- Strachan, R. and Jefferies, D. (1996).** Otter Survey of England 1991– 1994. A report on the decline and recovery of the otter in England and on its distribution, status and conservation in 1991– 1994. Vincent Wildlife Trust, London
- Sulkava, R. 2007.** Snow tracking: a relevant method for estimating otter *Lutra lutra* populations. *Wildlife Biol.* **13**: 208-218.
- Sulkava, R., U.M. Liukko, U.M. (2007).** Use of snow-tracking methods to estimate the abundance of otter (*Lutra lutra*) in Finland with evaluation of one-visit census for monitoring purposes. *Ann. Zool. Fenn.* **44**: 179-188.
- Sulkava, R., Sulkava, P.O., Sulkava, P.E. (2007).** Source and sink dynamics of density-dependent otter (*Lutra lutra*) populations in rivers of central Finland. *Oecologia* **153**: 579-588.

RESUME

Repartition de la loutre eurasiennne *Lutra lutra* (Linnaeus, 1758) dans deux regions du centre de l'Espagne (Province de Salamanque, Rivière Tormes)

La loutre eurasiennne (*Lutra lutra*) est une espèce particulièrement abondante dans le centre de l'Espagne. Il existe de nombreuses études sur sa répartition et son alimentation. Cependant, des données sur l'importance de la population sont rares. La densité de l'espèce a été estimée par inventaire des traces durant deux hivers consécutifs dans deux régions différentes du centre de l'Espagne. L'Indice d'Abondance Kilométrique (IAK) varie entre 0.14 loutre/km dans les environs de la ville de Salamanque et 0.25 loutre/km dans une région préservée. Ces résultats correspondent bien aux rivières de productivité moyenne et sont similaires à ceux obtenus dans le bassin méditerranéen.

RESUMEN

Abundancia de la nutria paleártica *Lutra lutra* (Linnaeus, 1758) en dos áreas de España central (provincia de Salamanca, río Tormes)

La nutria paleártica (*Lutra lutra*) es una especie bien distribuida en España central. Los estudios sobre presencia y dieta son abundantes, pero apenas existen datos sobre el tamaño poblacional. Se estimó la abundancia de la especie en dos áreas contrastadas de España central mediante el censo de huellas durante varios inviernos. El índice KAI (Índice Kilómetro de Abundancia) varió entre 0.14 nutrias/km en las cercanías de la ciudad de Salamanca y 0.25 nutrias/km en un área mejor conservada. Estos resultados son concordantes con ríos de productividad media y similares a los obtenidos en otras localidades de la cuenca mediterránea.