

# Carnivores of Seville province, Spain: a distribution atlas

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## Abstract

This note provides information dating from 2010 to December 2019 on carnivore distribution in the province of Seville, Spain. The authors' own observations (507) of live animals and roadkills have been combined with confirmed sightings registered in the online wildlife observation database Observado España (54), and the results plotted on 185 UTM squares representing areas of 10 × 10 km. Ten species were recorded, including several small carnivores: Wild Cat *Felis silvestris*; Spanish Lynx *Lynx pardinus*; Western Polecat *Mustela putorius*; Least Weasel *Mustela nivalis*; Beech Marten *Martes foina*; Eurasian Otter *Lutra lutra*; Eurasian Badger *Meles meles*; Common Genet *Genetta genetta*; Egyptian Mongoose *Herpestes ichneumon*; and Red Fox *Vulpes vulpes*. Eight squares (4.3% of total squares) had eight or more species; 43 squares (23.2%) had five to seven; 76 squares (41.1 %) had three or four; and 58 squares (31.4%) had one or two species.

**Keywords:** *Mustela putorius*, *Mustela nivalis*, *Martes foina*, *Lutra lutra*, *Meles meles*, *Genetta genetta*, *Herpestes ichneumon*, *Felis silvestris*

## Introduction

Seville is a province in the region of Andalusia, in the south of Spain (Fig. 1). The province is characterized by a Mediterranean climate and is dominated in the north by the Sierra Morena mountain range and in the south by the Sierra Sur part of the Betic mountain range, with the alluvial valley of the Guadalquivir River dividing the two ranges. The mountain ranges are mostly still covered by natural vegetation, which is also found in isolated patches in the valley. The most important natural protected areas are the Sierra Norte de Sevilla Natural Park in the north and the Doñana National Park in the south-west.

The carnivores in the province comprise two cats (Felidae: Wild Cat *Felis silvestris* and Spanish Lynx *Lynx pardinus*), five species of Mustelidae (Western Polecat *Mustela putorius*, Least Weasel *Mustela nivalis*, Beech Marten *Martes foina*, Eurasian Otter *Lutra lutra* and Eurasian Badger *Meles meles*), one civet (Viverridae: Common Genet *Genetta genetta*), one mongoose (Herpestidae: Egyptian Mongoose *Herpestes ichneumon*) and one dog (Canidae: Red Fox *Vulpes vulpes*). Until recently (Consejería de Medio Ambiente, Junta de Andalucía 2012) the Grey Wolf *Canis lupus* was present in the province but now is probably extinct.

This note aims to provide recent information (from 2010 to December 2019) bearing on carnivore distribution in the province, and for this purpose we have collected observations of live individuals by the authors, camera-trap records and roadkills (identified by the

authors). Tracks and other signs have been not included. The surveys covered the entire province of Seville, including 185 UTM squares of 10 × 10 km (91 entirely in Seville and the rest shared with other provinces).

We gathered a total of 507 of our own records (Table 1), including 133 roadkills. These are complemented by 54 photographically supported sightings since 2012 registered by experienced users on the online wildlife observation database Observado España ([www.observado.es](http://www.observado.es)), as well as information published by Palomo *et al.* (2007). Distribution is shown in a 10 × 10 km UTM grid map for each species (Fig. 1). Summarizing, we found eight squares (4.3% of total squares) with eight or more species; 43 squares (23.2%) with five to seven; 76 squares (41.1%) with three or four; and, finally, 58 squares (31.4%) with one or two species recorded (Fig. 1).

### Species accounts

#### *Felis silvestris*

Probably the least abundant carnivore of the province, the Wild Cat has only three recent records, all unconfirmed, in the north of the province. All three lack photographs, preventing confirmation of this species that is difficult to distinguish from free-ranging Domestic Cat *F. catus* and potential hybrids. Thus, we have decided to maintain it as doubtful. This species needs special attention involving specific surveys, particularly using camera-trapping (Gil-Sánchez *et al.* 2018, Gil-Sánchez *et al.* 2020).

#### *Lynx pardinus*

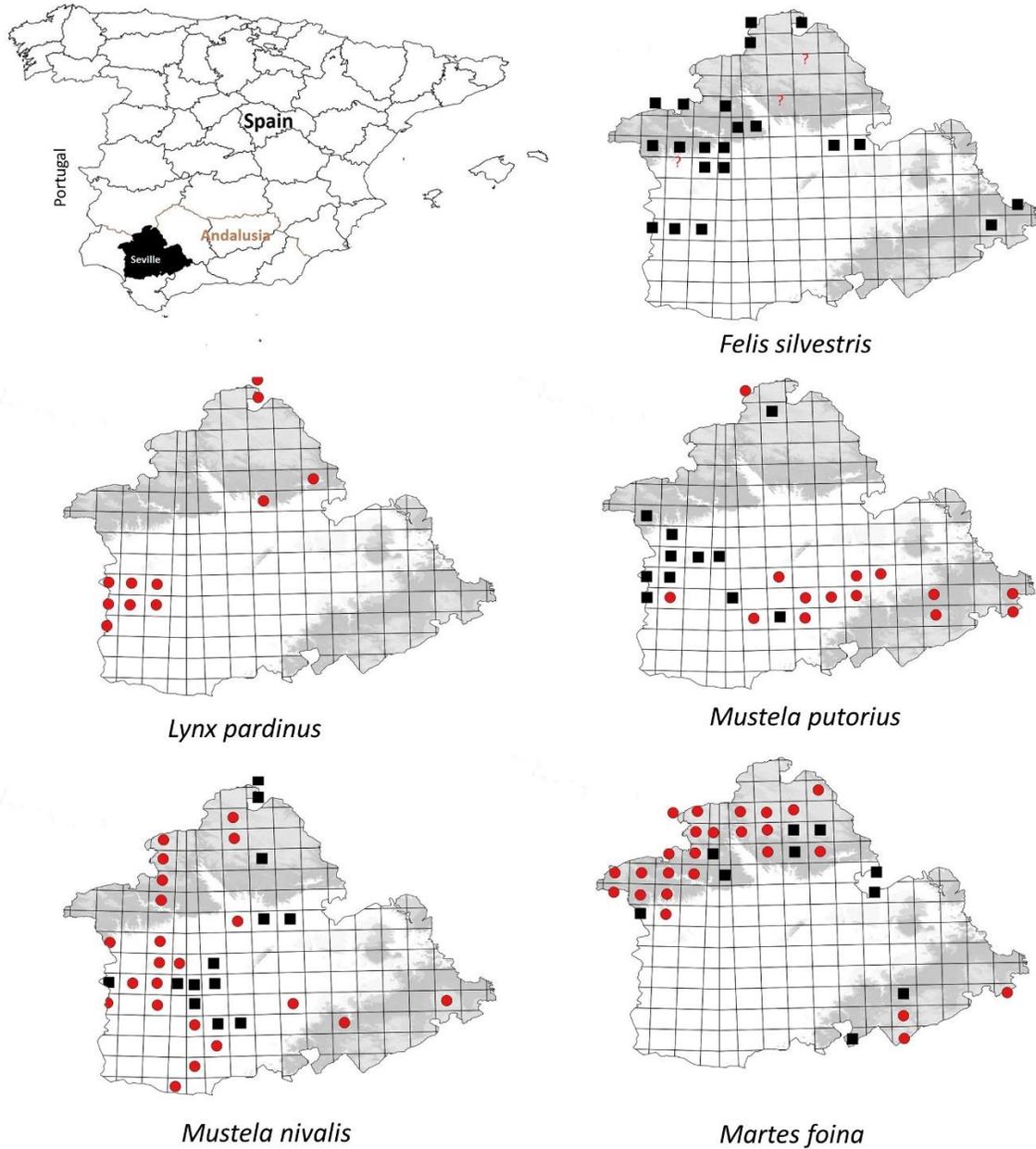
The threatened Spanish Lynx has increased its distribution in the province in recent years, mainly because of the well-executed work of several EU-LIFE projects for the species. Its main distribution area is the Doñana–Aljarafe region in the south-west. Thirty-two records were collated, without any roadkills detected by the authors. The squares in the north of the province correspond with individuals that have naturally dispersed recently from reintroduction areas (J. Salcedo, pers. comm.).

#### *Mustela putorius*

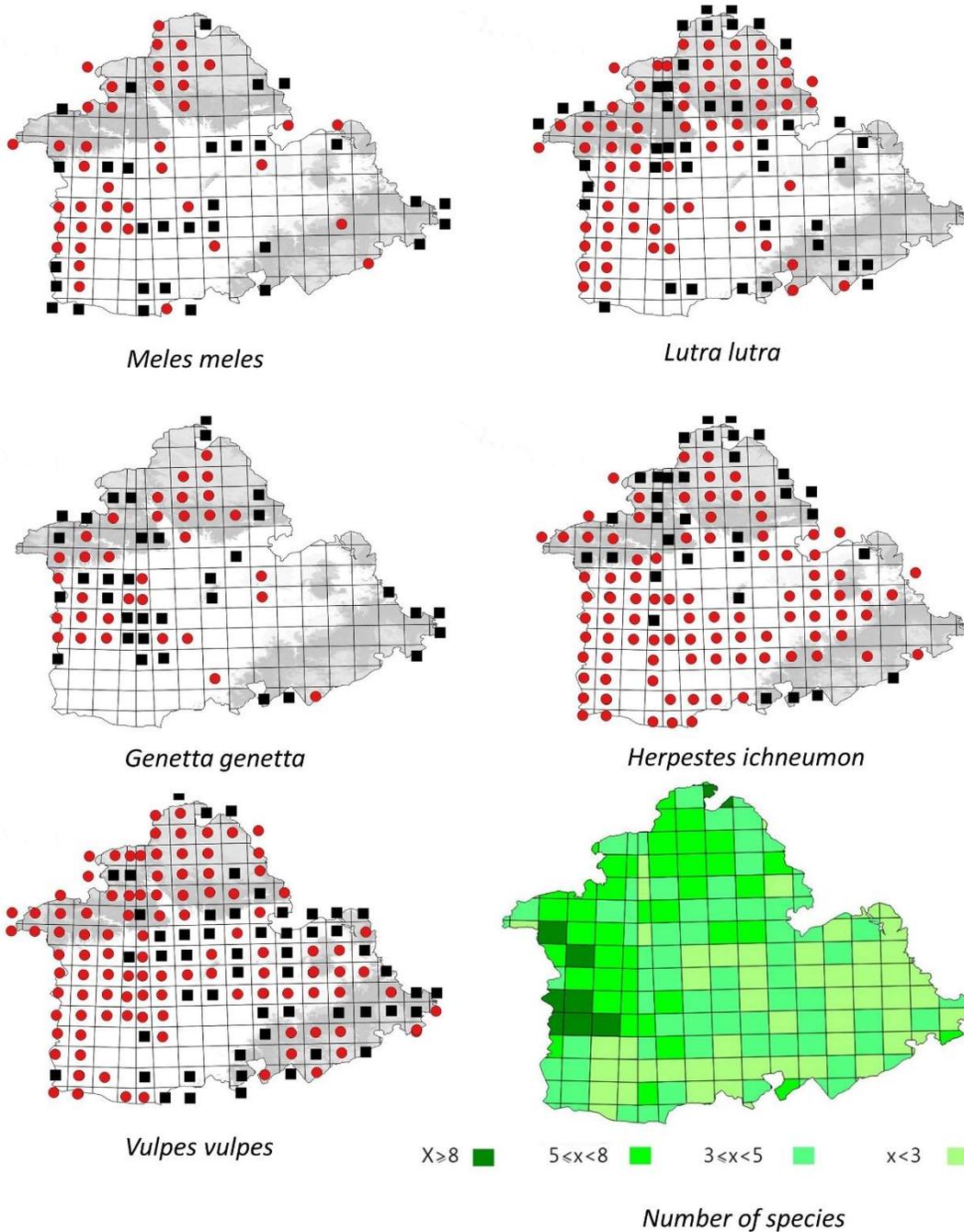
Western Polecat was recorded mostly in the Guadalquivir valley, where it is usually detected as roadkill (Rodríguez-Rodríguez & Salcedo 2018). We gathered 12 records, 11 of which were roadkills.

#### *Mustela nivalis*

Least Weasel is difficult to detect, due to its secretive behaviour. We gathered 19 records, including 11 roadkills. The actual distribution is probably wider than reflected by past and present records.



**Fig. 1** (continued next page). Map of Spain showing the location of the province of Seville, distribution maps for the species recorded in 10 × 10 km UTM squares, and a map indicating the number of species detected per square. Grid squares containing black squares represent that the species was recorded by Palomo *et al.* (2007). Grid squares with red dots indicate that the authors and/or external recent records document the species in that grid square in the period 2010-19 (Table 1). Squares with both past (Palomo *et al.* 2007) and recent records are marked as recent records). Dark shading indicates mountain ranges.



*Martes foina*

The Beech Marten is distributed mainly in the mountain ranges of the province, where it is not difficult to detect. We gathered 43 records, 15 being roadkills.

*Meles meles*

The Eurasian Badger is relatively well distributed, with confirmed presence throughout all regions of the province. We gathered 32 records, eight being roadkills.

**Table 1.** Summary of record data for each species of wild carnivore in the province of Seville, Spain, in the period 2010-19. The authors' own observations are represented in the three first columns.

Species	Direct observations of live animals <sup>a</sup>	Road-kills <sup>a</sup>	Total Records <sup>a</sup>	External records <sup>b</sup>	10 × 10 km UTM cells with records in Palomo <i>et al.</i> (2007) but not detected in the present study
<i>Felis silvestris</i>	3	0	3	0	22
<i>Lynx pardinus</i>	32	0	32	– <sup>c</sup>	0
<i>Mustela putorius</i>	1	11	12	4	12
<i>Mustela nivalis</i>	8	11	19	2	13
<i>Martes foina</i>	28	15	43	4	5
<i>Meles meles</i>	24	8	32	4	31
<i>Lutra lutra</i>	64	2	66	6	43
<i>Genetta genetta</i>	33	7	40	4	34
<i>Herpestes ichneumon</i>	61	42	103	15	33
<i>Vulpes vulpes</i>	124	38	162	16	54

<sup>a</sup> Our own records. <sup>b</sup> Photographically supported sightings since 2012 on the online wildlife observation database Observado España ([www.observado.es](http://www.observado.es)). <sup>c</sup> External records exist for this species but were neither sought nor collated (see text).

### *Lutra lutra*

A relatively commonly observed species throughout the province's water bodies, the Eurasian Otter is especially common in the Sierra Morena region. We gathered 66 records, including two roadkills.

### *Genetta genetta*

The Common Genet is a widely distributed species, and indeed the areas lacking records may simply indicate gaps in data. We gathered 40 records, seven of which were roadkills.

### *Herpestes ichneumon*

The Egyptian Mongoose is one of the most commonly observed carnivores of the province. We gathered 103 records, 42 being roadkills.

### *Vulpes vulpes*

The Red Fox is most commonly observed carnivore in Seville province. We gathered 162 records, including 38 roadkills.

## Discussion

Only three unconfirmed records of *F. silvestris* were traced; the species's status throughout the Andalusia region is a concern (see Gil-Sánchez 2018). No Grey Wolf *Canis lupus* were

detected; the species must be close to extirpation in this province. No other carnivore species have been extirpated from the area.

Although many historic locality records have not been replicated during this collation and review of records since 2012, differences in survey methods and effort may explain many of these non-detections; i.e. these non-detections may not represent genuine range contractions or changes in occupancy. Squares with a low number of species detected are in areas where intense agriculture dominates; low quality habitat, increased human–wildlife conflict and survey biases may all be contributing to the detection patterns.

Not all carnivores recorded are native. Although *H. ichneumon* has been traditionally considered to have been introduced to Europe in historical times (Detry *et al.* 2011), recent studies point to a native origin (Gaubert *et al.* 2011). In the case of *G. genetta*, studies conclude a human introduction with several nuclei, possibly during the 17th century (Gaubert *et al.* 2011). The only exotic carnivore species that poses a real risk to native ecosystems in the Seville province is the Domestic Cat *Felis catus*. No other exotic species of carnivorous mammals have wild populations in the area.

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