MAMMAL SURVEY

SERRA DO COUREL

GALICIA, SPAIN 2012

RAPPORT 2013.029 Nijmegen, oktober 2013

Uitgave van de Veldwerkgroep van de Zoogdiervereniging

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SUMMARY

by: Kees Mostert

From July 24th till August 3th 2012 the Field Study Group of the Dutch Mammal Society (Zoogdiervereniging) organized a summer camp in the mountainous area of Serra do Courel, part of Lugo province in Galicia, North Western Spain. Dense forests are interspersed by small-scale meadowlands, stream rapids, stone watermills and centuries-old chestnut trees. Channels dug in the hills are fed by natural springs and run besides beautiful green meadows on the hill slopes. At the Pico Formigueiros, the mountains reach a maximum height of 1,654 m. The valleys are cut through by numerous streams which feed the Rio Sil. Due to height differences, diversity in soil composition and climate, the Serra do Courel is rich in plant and animal species.

The mammal study was mainly focused on the eastern half of the area since hardly any mammal data was available from these parts. Practically all means were applied to gather as much distribution data as possible. One of the most important goals was to determine the presence of the Pyrenean desman in the various watersheds of the area. A clever system was used to put out fyke nets (hoop nets). This soon led to the first catch in the dead of night. Three more followed during the camp. Due to mortality among the catches and the fact that the main question had been answered, it was decided to stop using this trapping method before the end of the camp.

Another important activity was placing mist nets in as many different biotopes as possible to catch bats. This survey method ultimately yielded eleven bat species. The most exceptional among these was *Myotis spA*, whose occurrence had not yet been established in the area. Myotis spA is the name used to identify a recently discovered bat species which is related to Escalera's bat. So far, the species has only been found in the catchment areas of the rivers Niava and Eume. Other interesting captures were those of a few Escalera's bats, Barbastelles, Leisler's bats and Grey long-eared bats. By searching a great number of deserted houses in the villages, roosts of mostly Lesser horseshoe bat were found, but also some of Geoffroy's bat and Common long-eared bat. Our very own camp accommodation was found to house a colony of Common pipistrelles and 52 emerging animals were counted.

Both during the day and at night observations were made of Red fox, Badger, Wild boar and Roe deer. The presence of European otter and Genet was established on the basis of tracks such as food remains and droppings. One of the camp's highlights was the presence of a group of approximately 10 wolves in the direct vicinity of the camp accommodation in Seara. Almost immediately after the start of the camp, a number of droppings with many hairs in them were found on small trails at no more than a kilometer west of the village, but they were initially attributed to domestic dogs. Halfway through the camp however, calling and howling wolves were heard repeatedly during twilight. They could even be heard from the camp accommodation. On one of the last evenings, two young wolves were seen at close distance in the mountains and a few more sightings followed.

In spite of an abundance of varied biotopes near the camp accommodation, the live trap study initially yielded very few catches. We have encountered this phenomenon before in southern Europe. In the end, five small mammal species were captured. Among the more interesting species are Iberian shrew, European snow vole and Garden dormouse. The two latter were captured in some rocky outcrops. The captures of Yellow-necked mouse and Field vole were nice because these species are at the edge of their distribution area here. In two of the many empty houses in the deserted villages, a substantial number of Barn owl pellets was collected. Analysis of pellets is always particularly useful for small mammal surveys. Skull remains were discovered of twelve small mammal species, eight of which were not found with any other method.

Camera traps were placed in numerous locations. Clear pictures were obtained of Pine marten, Roe deer, Wild boar, Red fox and Wolf. A special joint excursion was organized to an open mountainous area, covered with broom. This is habitat of the rare and endemic Broom hare, which occurs locally in a few mountainous areas in northwestern Spain. After nightfall a few hares appeared in the lights of our cars and flashlights. They were surprisingly easy to approach and observe. It turned out that the hares are mostly active during the night.

All in all, with the various survey methods used, 43 mammal species were found (table 1) and a large amount of data was gathered in the Natura 2000-area of Serra do Courel.

Scientific name	English name	Sighting	Catch	Finding (dead)	Bat detector Batrecorder	Tracks or Droppimgs	In owl pellet	Camera trap
Erinaceus europaeus	Hedgehog	◆		◆				
Sorex granarius	Iberian shrew		◆				◆	
Sorex minutus	Eurasian pygmy shrew						◆	
Crocidura russula	Greater white-toothed shrew						◆	
Crocidura suaveolens	Lesser white-toothed shrew						◆	
Galemys pyrenaicus	Pyrenean desman		◆					
Talpa occidentalis	Spanish mole			◆		◆	◆	
Rhinolophus hipposideros	Lesser horseshoe bat	◆			◆	◆		
Myotis alcathoe	Alcathoe whiskered bat		◆		◆			
Myotis daubentonii	Daubenton's bat	◆	◆		◆			
Myotis emarginatus	Geoffroy's bat	◆	◆		◆			
Myotis mystacinus	Whiskered bat		◆					
Myotis escalerai	Escalera's bat		◆		◆			
Myotis spA	Myotis spA		◆					
Pipistrellus pipistrellus	Common pipistrelle	◆	◆	◆	◆	◆		
Hypsugo savii	Savi's pipistrelle		◆		◆			
Nyctalus leislerii	Leisler's bat		◆		◆			
Eptesicus serotinus	Serotine		◆		◆			
Barbastella barbarstellus	Barbastelle		◆		◆			
Plecotus auritus	Common long-eared bat	◆	◆					
Plecotus austriacus	Grey long-eared bat		◆					
Miniopterus schreibersii	Schreiber's bat	◆			◆			
Tadarida teniotis	European free-tailed bat	◆			◆			
Lepus castroviejoi	Broom hare	◆						
Myodes glareolus	Bank vole						◆	
Arvicola sapidus	Southern water vole						◆	
Microtus agrestis	Field vole						◆	
Microtus lusitanicus	Lusitanian pine vole		◆				◆	
Chionomys nivalis	European snow vole		◆					
Apodemus flavicollis	Yellow-necked wood mouse		◆				◆	
Apodemus sylvaticus	Wood mouse		◆				◆	
Mus spretus	Algerian mouse			◆			◆	
Glis glis	Edible dormouse	◆						
Eliomys quercinus	Garden dormouse		◆					
Canis lupus	Wolf	◆				◆		◆
Vulpes vulpes	Red fox	◆				◆		◆
Mustela nivalis	Weasel	◆				◆		
Martes martes	European pine marten	◆						◆
Meles meles	European badger	◆				◆		
Lutra lutra	European otter					◆		
Genetta genetta	Common genet					◆		
Sus scofra	Wild boar	◆		◆		◆		◆
Capreolus capreolus	European roe deer	◆		◆		◆		◆

Table 1 Mammal species observed in Serra do Courel, Galicia, Spain 2012.

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1 INTRODUCTION

by: Lily Vercruijsse

This report presents the results of the summer camp which was organized by the Field Study Group of the Dutch Mammal Society (Zoogdiervereniging) from July 24th till August 3th 2012. The aim of this summer camp was to obtain information on the occurrence and distribution of mammals in Serra do Courel, located in the Southeast of Galicia, Spain. In the area of interest little is known about the presence and abundance of mammal species. Apart from mammals many sightings of birds, reptiles, amphibians, butterflies, dragonflies, grasshoppers and crickets in the area were recorded.

The camp was organized after preliminary contact with Paolo Barros, with whom we had cooperated before, during summer camps in 2003 in Alvão Natural Park and in 2009 in Serra da Estrela, both in Portugal. Paolo brought us into contact with Roberto Hermida, a Spanish biologist who studies the Serra do Courel. The Field Study Group was invited to contribute to mammal studies in the Natura 2000 area of Serra do Courel. Mammal studies are scarce especially in the eastern half of the area. We were housed in an accommodation of the Galician Mountaineering Federation in the village of A Seara do Courel, situated centrally in the area of study (figure 1.1). The house was at about 1000 m elevation in a valley of the Rio Selmo. Population density here is among the lowest of the area due to many people leaving for the cities. Therefore, many villages consisted mainly of dilapidated houses with only a few among them inhabited, offering many opportunities for surveys of bats and collecting owl pellets.

The summer camp participants (figure 1.2) originated from four different countries: Spain, Portugal, The Netherlands and Belgium. We would like to say thanks to Jan Buys for all his work during the preparation of this camp. Jan Wondergem, Kees Mostert, Rene Jansen and Lily Vercruijsse were responsible for the organisation during the camp. Kees Mostert was the main editor of this report, for which Eric Thomassen translated most of the text from Dutch into English, and of which Jeroen Willemsen took care of the layout.

Photo: Jan Buys

Figure 1.1 The surroundings of Seara in the Serra do Courel.

Photo: Jan Buys

Figure 1.2 Participants of the sumer camp 2012.

The 2012 summer camp participants were:

1 Roberto Hermida
2 Thijs Bosch
3 Alfred van Zwam
4 Paulo Barros
5 Raymond Haselager
6 Kees Mostert
7 Zeltia López Gallego
8 Jan Wondergem
9 Jan Buys
10 Eric Janssen
11 René Janssen
12 Heleentje de Brauwer
13 Iwan Lewylle
14 Karl van Ginderdeuren
15 Lily Vercruijsse
16 Pieter-Jan d'Hondt
17 Dennis Wansink

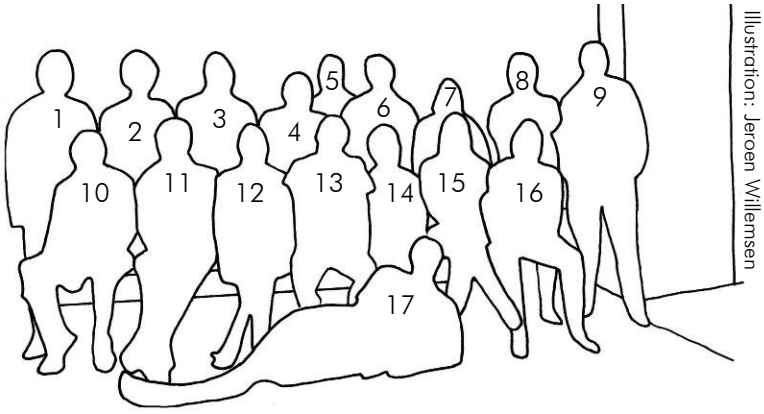


Illustration: Jeroen Willemsen

2 DESCRIPTION OF THE AREA OF STUDY

by: Lily Vercruijsse

Galicia has been one of Spain's 17 autonomous regions since 1978 and is situated in the Northwest. Galicia is bordered by Portugal in the South, by the Atlantic Ocean in the West, the Bay of Biscay in the North and the regions of Asturias and Castilla y Léon in the East. The region of Galicia is separated from León by the Serra do Courel, a mountain range that range runs Northeast-Southwest. The municipality of Folgoso do Courel is situated in the east of Galicia in the province of Lugo and covers an area of 193 km^2 (figure 2.2). This municipalty includes 45 villages where age-old traditional ways of living and working may be encountered. The winding roads along rounded steep slopes provide new views at every turn. Dense forest is interspersed by waterfalls, stone watermills and centuries-old chestnut trees. Channels, dug in the hills and fed by natural springs, run besides beautiful green meadows on the hill slopes.

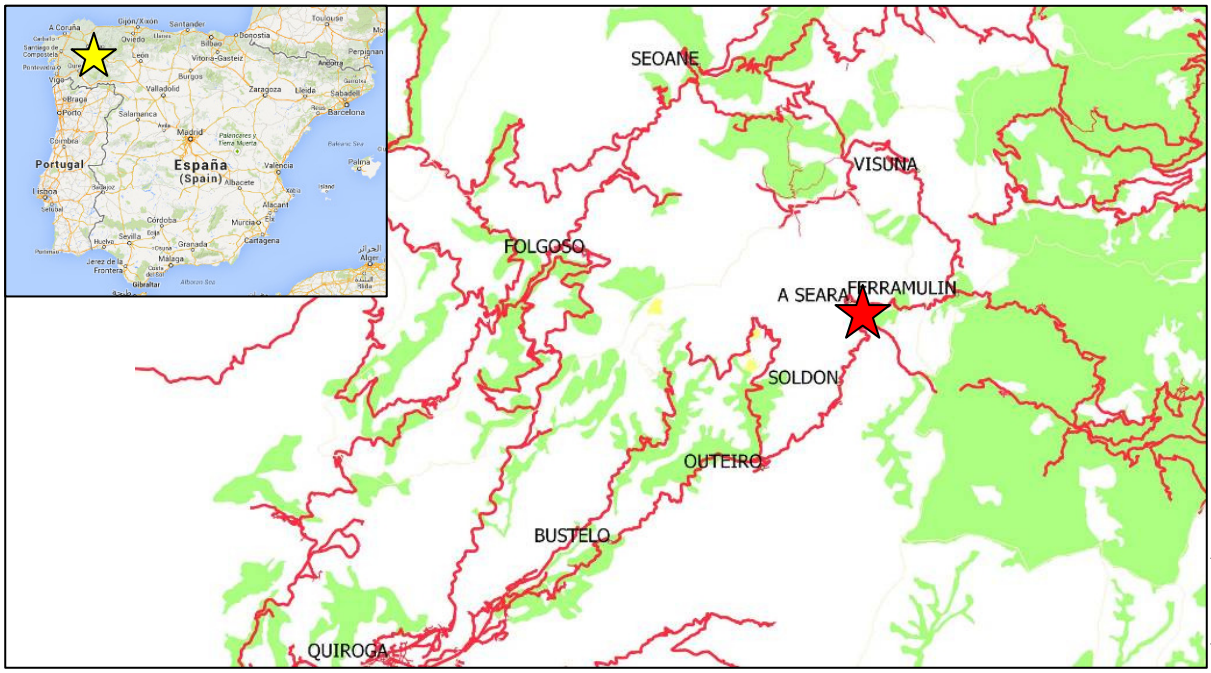
The effect of limestone deposits on soil conditions has led to a large concentration of caves with limestone stalactites and stalagmites. Due to exposition, height differences, diversity of soil conditions and climate, the area has a high level of biodiversity: in spite of its relatively small area (1% of Galicia), Serra do Courel includes 40% (about 800 species) of the plant species found in Galicia. The mountains, which consist mainly of slate, schist and sand stone (interspersed by quartz), reach a maximum elevation of 1,654 meters at the Pico Formigueiros. The various streams that run through the valleys and the three major watersheds (Lor, Soldón and Quiroga) feed the Rio Sil.

The moist forests with a northern exposure (Devesas) house most of the 40 mammal species occurring in Serra do Courel, with among them Wild boar, Hare, Red fox, Wolf, Pyrenean desman, Wild cat and, along the banks of streams, Otter. A major part of Galicia consists of an irregular heterogeneous landscape due to many years of traditional agriculture and cattle breeding. A huge decrease of the population and of cattle breeding has led to an increase in the area covered by shrub and planted forest as well as to an increase of the area used as farmland. Original forest with a variation of birch *(Betula celtiberica)*, oak *(Quercus robur)* and holly *(Ilex aquifolium)* now only occurs along streams and in valleys. Parts of the area are covered with pine plantations *(Pinus sylvestris)*, but the region is mostly dominated by shrubs with heather *(Erica australis)*, gorse *(Pterospartum tridentatum)* and woolly rock rose *(Halimium lasianthum)* (Barja 2009).

Contrary to the rest of Spain, Galicia has a maritime climate under the strong influence of the Atlantic Ocean. This climate is characterized by mild winters and warm summers with maximum temperatures varying between 20-25°C in summer and minimum temperatures varying between 3-6°C in winter. Snowfall occurs regularly from November to April and all year, but mostly in autumn, there is abundant rainfall with >1,000 mm through the area and up to 2,800 mm in some mountain villages. Due to the copious amount of rain, many small streams are used by the local population as a natural form of irrigation channels.

Photo: Jan Buys

Figure 2.1 The village of A Seara.



Map: Jan Buys

Figure 2.2 The area of Serra do Courel. The red star indicates the camp location in Seara.

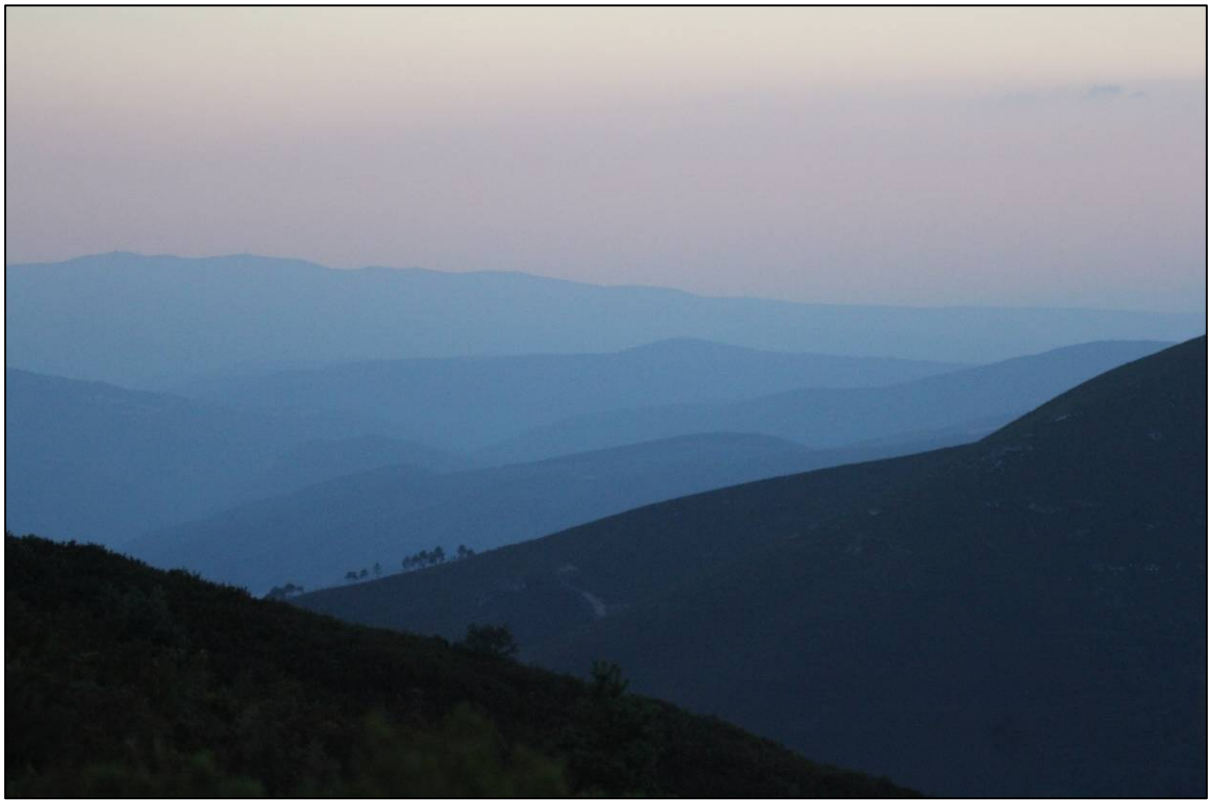


Photo: Kees Mostert

Figure 2.3 Impression of the atmosphere in Serra do Courel in the evening.

3 LIVE TRAP SURVEY

by: Kees Mostert

Although each and every trap location was situated in beautiful, varied and promising biotope near the camp site, the live trap study yielded few catches. The Fieldwork Group has encountered this phenomenon before in southern Europe. In the end, six small mammal species were captured. Tree traps (Sherman traps) were placed at a few locations in the broad vicinity of the camp. Since there were no captures in these traps, the tree traps are not mentioned further in this report.

3.1 SURVEY METHODS

Different types of so-called live traps were used:

- Longworth traps (available 250); measuring length 24 cm, width 7 cm, height 8.5 cm, stuffed with hay and baited with a mixture of rolled oats with peanut butter and pieces of apple.
- Sherman traps (available 44); measuring length 24 cm, width 7 cm, height 8.5 cm, baited with dried apricots and placed on a piece of plywood 30 cm x 8 cm. A long stick was used to place the traps in trees or on high walls.
- Pitfall traps (available 200); soft drink cups 500 ml measuring length 15 cm x 9 cm, baited with mealworms, placed against stone walls and covered with fig leafs to protect from rain.

After setting the traps, inspections were carried out the first morning with all the summer camp participants. This procedure resulted in a shared knowledge of trap locations by each participant. From the next morning a designated group of several people took care of the inspections each day. The frequency of the inspections was two times a day, one in the early morning and one in the late evening. All small mammals captured for the first time were marked by cutting some of the hair on the back side, enabling recognition of individuals that were captured more than once.

Photo: Jan Buys

Figure 3.1 European snow vole (Chionomys nivalis) *was one of the captures in live traps.*

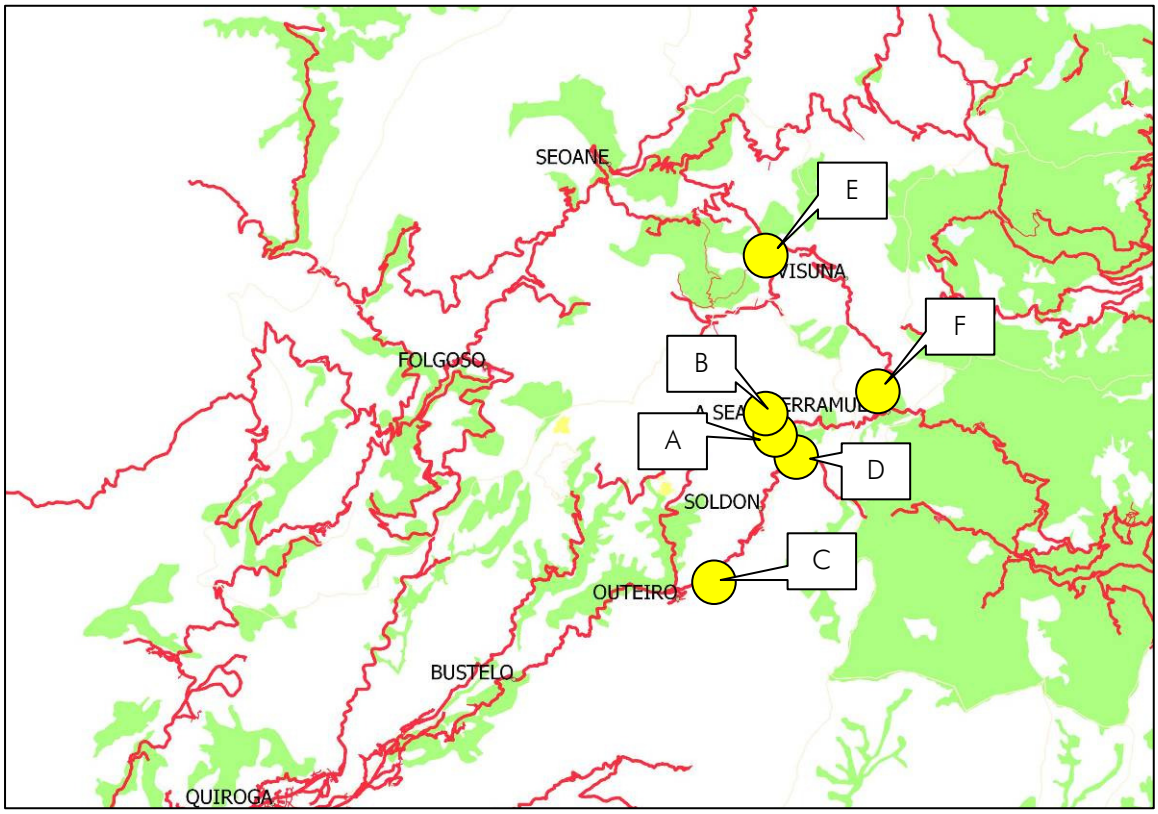


Figure 3.2 Live trap locations.

3.2 LOCATIONS

Six different lines of live traps were placed. They are displayed on a map in figure 3.2. In each line the traps of the different types were numbered successively and each individual trap was marked with a piece of aluminum foil. The distance between the traps was approximately five meters, sometimes slightly more or less due to the specific situation at the spot, such as boulders or terrain without vegetation. All traps were set with the trap doors unlocked from the start.

On July 24th, traps were placed at three locations. Each trapping station consisted of 50 Longworth traps which were checked three times per day. On July 29th, the traps at locations A and C were cleared away, while traps at location B were left for another night. Traps at locations D were set on July 30th and left for two days, while locations E and F were checked from July 30th onwards. The traps at these three locations were removed on August 2nd. A total of 1350 trap nights was achieved during the summer camp.

3.3 RESULTS

There were very few captures during the camp. They are summarized in table 3.1 and table 3.2. A total of 64 captures of five species was recorded: Iberian shrew, European snow vole, Garden dormouse, Yellow-necked mouse and Wood mouse. By far the most abundant among the captures, accounting for 50 out of 64 captures, was Wood mouse. In a few cases, when the animal escaped for example, individuals could not be identified at species level (Wood mouse – Yellow-necked mouse), but it is almost certain that these were Wood mice. During the first five nights, only Wood mice were captured at locations A, B and C, after which locations A and C were cleared away while location B was allowed another night to finally achieve almost the same result. Location B and D yielded Field vole, Wood Mouse and Yellow-necked mouse. Location E (figure 3.4) was the most interesting, with three Snow voles and five Garden dormice captured among the large rocks. Finally, at location F (figure 3.5 - a strip of herbaceous shrubs along a stream and a small meadow) two Iberian voles, three Wood mice and one Yellow-necked mouse ware captured.

Location	A	B	C	D	E	F	TOTAL
# trapping nights	250	300	250	150	200	200	1350
Sorex granarius						2	**2**
Chionomys nivalis					3		**3**
Eliomys quercinus					5		**5**
Microtus agrestis				1			**1**
Apodemus sylvaticus	15	20	8	4		3	**50**
Apodemus flavicollis		1		1		1	**3**
TOTAL	**15**	**20**	**8**	**4**	**8**	**6**	**64**

Table 3.1 Number of captures per location.

Date	25/7	26/7	27/7	28/7	29/7	30/7	31/7	1/8	2/8	TOTAL
# trapping nights	150	150	150	150	150	150	150	150	150	1350
Sorex granarius						1		1		**2**
Chionomys nivalis						1	2			**3**
Eliomys quercinus						4	1			**5**
Microtus agrestis								1		**1**
Apodemus sylvaticus	8	16	10	2	2	6	2	2	2	**50**
Apodemus flavicollis					1		1	1		**3**
TOTAL	**8**	**16**	**10**	**2**	**3**	**12**	**6**	**5**	**2**	**64**

Table 3.2 Number of captures per day.

Photo: Jan Buys

*Figure 3.3 Two individuals of the Iberian shrew (*Sorex granarius*) were captured at location F. It was not recorded at other locations.*

Photo: Jan Buys

Figure 3.4 Trap location E.

Photo: Jan Buys

Figure 3.5 Trap location F.

4 OWL PELLETS

by: Kees Mostert

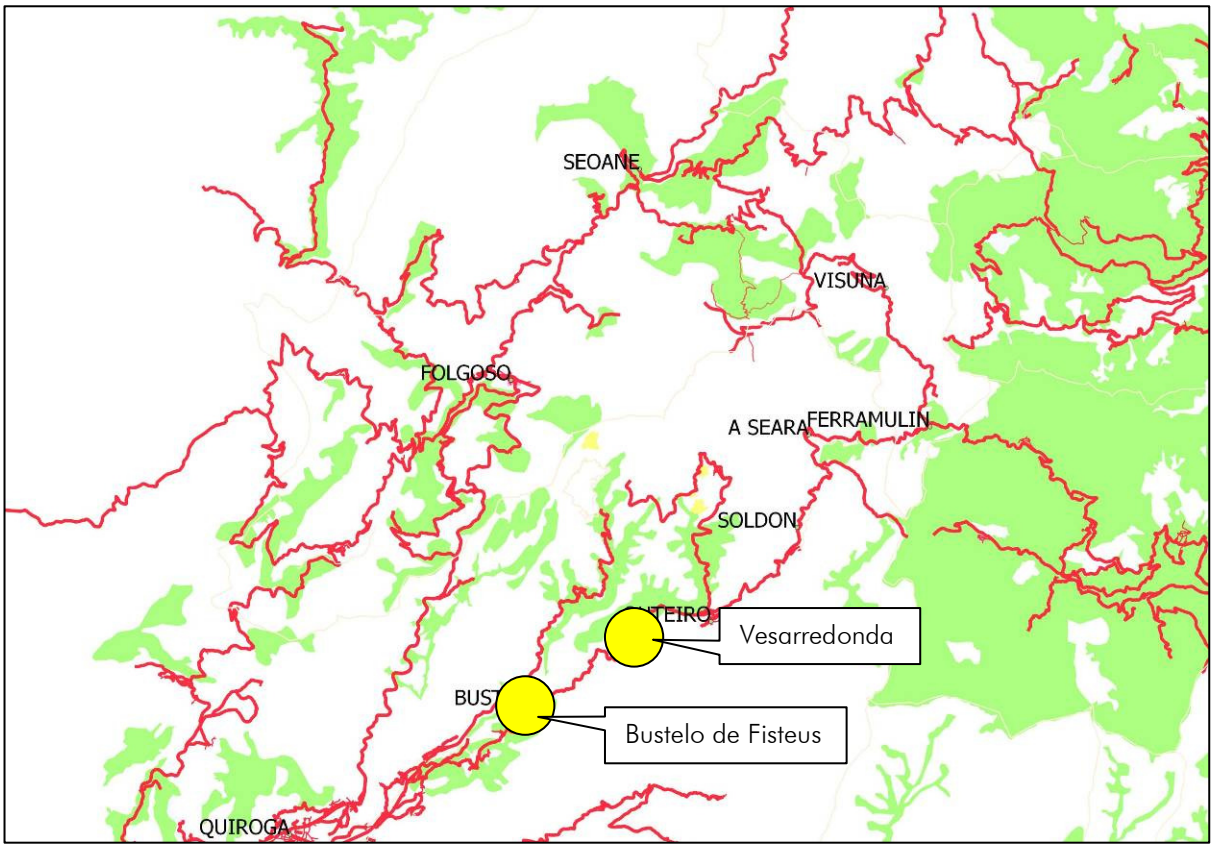
Barn owl (*Tyto alba*) pellets were found in two locations (figure 4.1). In both cases, the pellets were found on dilapidated and deserted attics of houses in the hamlets Bustelo de Fisteus and Vesarredonda. These villages are located at approximately 10 and 12 km southwest of Seara.

In the Bustelo de Fisteus and Vesarredonda pellet batches, 220 and 113 prey animals were found respectively, originating from twelve small mammal species. Details are displayed in table 4.1. Six of these species were not found with any other method in the study area: Eurasian pygmy shrew, Greater white-toothed shrew, Lesser white-toothed shrew, Southern water vole, Lusitanian pine vole and Bank vole. It's remarkable how in both batches Wood mice are staple food (55% in all), followed by Lusitanian pine vole (16%) and Greater white-toothed shrew (14%). Small percentages of all the other species were found. Size measurements were taken only from *Apodemus* lower mandibles. The skulls were not studied further since there were fewer of those than lower mandibles.

Surprisingly, in spite of the fact that there are only a few kilometers between the locations, there is much difference between the two. In Bustelo de Fisteus, the relatively greater share of Greater white-toothed shrews stands out while in Vesarredonda more species were found, such as Southern water vole, Bank vole and Algerian mouse. These batches of pellets are an indispensable addition to the mammal survey in Serra do Courel.

Location/species	Bustelo de Fisteus			Vesarredonda		
	Left lower mandibles	Right lower mandibles	Skulls	Left lower mandibles	Right lower mandibles	Skulls
Sorex granarius	8	7	**11**	7	8	**12**
Sorex minutus	1	1	**1**	3	3	**3**
Crocidura russula	34	36	**38**	8	8	**8**
Crocidura suaveolens	7	7	**8**	2	3	**5**
Talpa occidentalis	1	1	**1**			
Arvicola sapidus				3	3	**3**
Microtus lusitanicus	37	38	**40**	9	8	**12**
Microtus spec.	1	1		1	1	**1**
Microtus agrestis				3	2	**2**
Myodes glareolus				1	1	**1**
Apodemus sylvaticus	64	60	**n.o**	22	24	**24**
Apodemus flavicollis	55	56	**n.o**	41	41	**n.o**
Mus spretus				1	1	**1**
TOTAL			**220**			**113**

Table 4.1 Small mammal remains in owl pellets.



Map: Jan Buys

Figure 4.1 Collected owl pellets.

5 BAT RECORDINGS

5.1 MIST NET CAPTURES

by: Kees Mostert

Mist netting as a method for surveying bats has been a standard part of Fieldwork Group summer camps for a good number of years. This year then, as in other years, much time was spent capturing bats with mist nets. Generally, the number of bats captured on any single night was not unusually high, with some exceptions which were mainly at sites with water reservoirs at high altitudes where little water is available to bats. The locations of mist netting sessions (16 in number) are presented in figure 5.2.

Between 24 July and 1 August, bats were captured with mist nets at one or several locations every night. All catching are summarized in table 5.1 and table 5.2. Most sites were over streams or fire water reservoirs. During the camp, 94 bats of 13 different species were captured. Savi's pipistrelle was the most frequent capture (30x), followed by Common pipistrelle (24x) and Daubenton's bat (16x). These three species together accounted for two thirds of all bats captured. A few individuals were captured of most other species: 3 Alcathoe whiskered bats, 1 Escalera's bat, 1 Myotis sPA, 2 Geoffroy's bats, 4 Whiskered bats, 5 Barbastelles (figure 5.3), 1 Serotine, 4 Leisler's bats, 1 Brown long-eared bat and 2 Grey long-eared bats. Several of the Daubenton's bats captured were identified as the subspecies *Myotis daubentonii nathalinae*. It is remarkable that no Greater or Lesser Mouse-eared bats were captured. The same can be said to some extent of the absence of horseshoe bats. This may have been caused by the choice of mist net sites.

Of all the individuals of which the sex was determined, by far most were males (56), while less were females (30). In eight cases, the animal escaped prematurely and the sex could not be determined. Practically all Daubenton's bats captured were males. The success rate of mist netting varied from location to location, with a maximum of 33 captures at Alto do Couto. At most locations a few animals, belonging to a few species were captured. Besides bats, two Nightjars and a Common linnet were captured in the mist nets.

Besides *M.nattereri* s.s., there are two other species of Natterer's bat s.l.: *M.escalarai* and *M.spA*. Here, two characters are described for discriminating between these three species based on 1) attachment of the plagiopatagium to the hind feet and 2) orientation of hair rows on the uropatagium edge. *Myotis sPA* is the name which is used to identify a recently discovered bat species which is related to Escalera's bat (*Myotis escalerai*), from which it is distinguished with difficulty on the basis of morphology alone. However, the species does have a few clear diagnostic characteristics, such as a different attachment of the wing membrane to the hind legs and different hair on the tail membrane (figure 5.1). So far, the species has only been found in the catchment areas of the rivers Niava and Eume, although it is expected to occur in a larger area. It is mainly found in mixed forests and rural areas with many trees. In light of this, the capture of Myotis spA during the summer camp may rightly be called spectacular.

Photo: Jan Buys

Figure 5.1 Hairs on the tail membrane of Myotis spA.

During the mist net activities some batcorders were placed in the surroundings of the mist net. Sound recordings were analyzed by Raymond Haselager, and provided Lesser horseshoe bat, Alcathoe whiskered bat, Geoffroy's bat, Escalera's bat, Common pipistrelle, Savi's pipistrelle, Serotine, Barbastelle and Schreiber's bat.

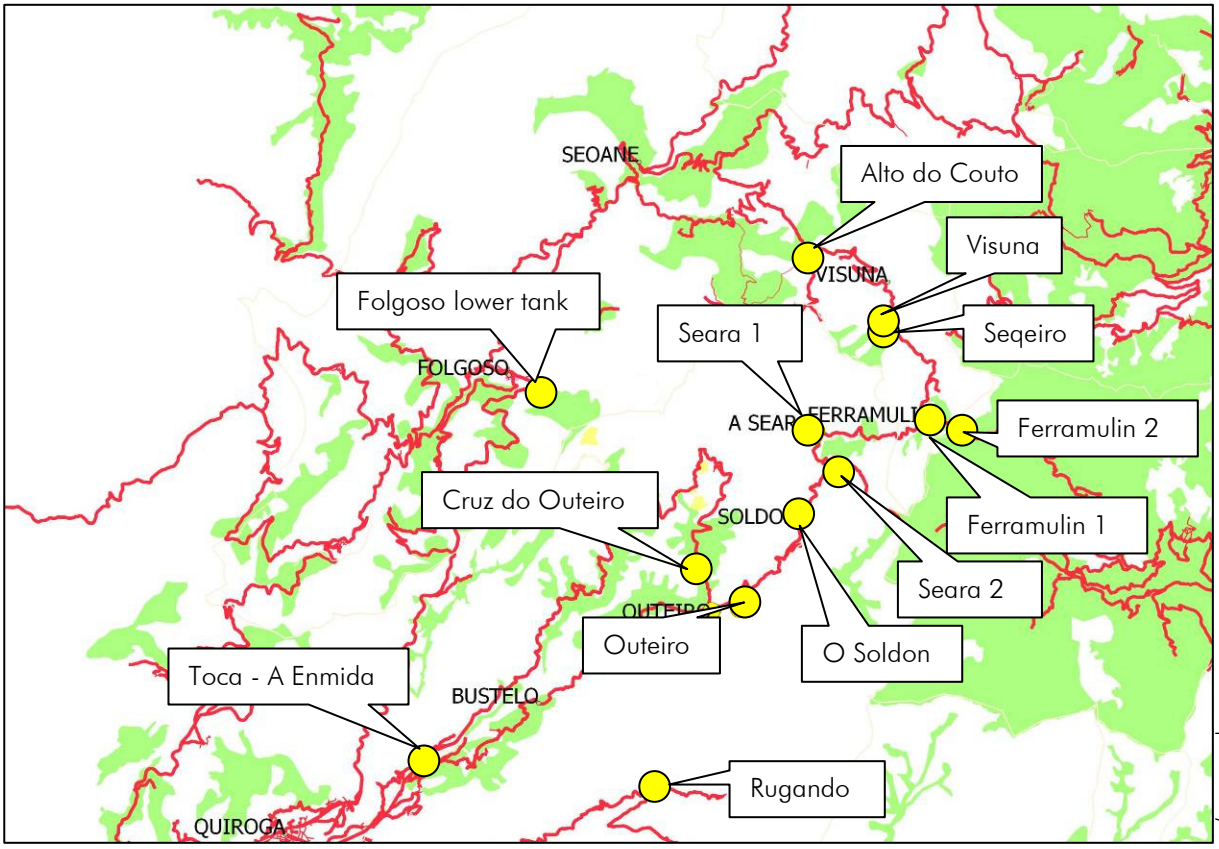


Figure 5.2 Mist net locations.

Species name	Male	Female	Unknown	TOTAL
Myotis daubentonii	15	1		**16**
Myotis mystacinus	3		1	**4**
Myotis alcathoe	1	2		**3**
Myotis emarginatus	1		1?	**2**
Myotis escalerai	1			**1**
Myotis spA	1			**1**
Pipistrellus pipistrellus	14	8	2	**24**
Hypsugo savii	12	17	1	**30**
Eptesicus serotinus	1			**1**
Nyctalus leisleri	3		1	**4**
Barbastella barbastellus	3		2	**5**
Plecotus auritus	1			**1**
Plecotus austriacus		2		**2**
TOTAL	**56**	**30**	**8**	**94**

Nightjar				**2**
Common linnet				**1**

Table 5.1 Number of mist net captures of bats, listed by genus.

Date	Location	*Myotis daubentonii*	*Myotis mystacinus*	*Myotis alcathoe*	*Myotis emarginatus*	*Myotis escalarai*	*Myotis spA*	*Pipistrellus pipistrellus*	*Hypsugo savii*	*Eptesicus serotinus*	*Nyctalus leisleri*	*Barbastella barbastellus*	*Plecotus auritus*	*Plecotus austriacus*	TOTAL
26-jul	Ferramulin 1	2													**2**
26-jul	Outeiro	2		1											**3**
26-jul	Visuna							1							**1**
26-jul	Cruz do Outeiro	1						1							**2**
27-jul	Alto do Couto				1?		1	3	25	1	2				**33**
27-jul	Outeiro	1		2											**3**
27-jul	Seara 1											1			**1**
28-jul	Seqeiro		2					1							**3**
28-jul	Outeiro	1						3				2		2	**8**
28-jul	Ferramulin 2	1			1										**2**
29-jul	Rugando	4						3	2		1				**10**
29-jul	Folgoso					1		7	1						**9**
30-jul	O Soldon											2			**2**
31-jul	Alto do Couto							3	2		1		1		**7**
31-jul	Seara 2		2					1							**3**
1-aug	Toca - A Enmida	4						1							**5**
	TOTAL	**16**	**4**	**3**	**2**	**1**	**1**	**24**	**30**	**1**	**4**	**5**	**1**	**2**	**94**

Table 5.2 Number of mist net captures of bats, listed by location and date.

Photo: Jan Buys

Figure 5.3 Barbastelle (Barbastella barbastellus).

5.2 BATS IN OLD BUILDINGS

by: Kees Mostert

In the broad vicinity of the camp accommodation all deserted and accessible building were surveyed for presence of bats. Dozens of houses were visited this way. Although locations often looked promising, bats were found in only a few of them.

Success was achieved particularly around the beautiful villages of Vesarredonda and Bustelo de Fisteus. Here, no less than three groups of 23, 10 and 10 Lesser horseshoe bats were found on attics (figure 5.4). At a nearby location many dozens of droppings of the same species were found, without any animals being present. Furthermore, a single Geoffroy's bat was found. All results are presented in table 5.3.

Results at other locations were limited to the discovery of a single Brown long-eared bat in a roost in Orejudo Dorado. Droppings were found (often in small quantities) in a few other buildings, but it was not possible to identify the species. In total, three bat species were found using this method.

Species	Date	Number	Identification by	Location
Myotis emarginatus	25-07-2012	1	sight	Vesarredonda
Plecotus auritus	25-07-2012	1	sight	Orejudo Dorado
Rhinolophus hipposideros	27-07-2012		droppings	Vesarredonda
Rhinolophus hipposideros	27-07-2012	23	bat detector	Bustelo de Fisteus
Rhinolophus hipposideros	27-07-2012	10	bat detector	Bustelo de Fisteus
Rhinolophus hipposideros	27-07-2012	10	bat detector	Bustelo de Fisteus

Table 5.3 Results of bat surveys in old buildings.

Photo: Kees Mostert

Figure 5.4 Lesser horseshoe bats (Rhinolophus hipposideros) *on an attic.*

5.3 BAT DETECTOR OBSERVATIONS

by: Kees Mostert

Identifying bats with bat detectors in a new environment, and especially in southern Europe, is a precarious adventure. There is a number of easily identified species, but also ones (particularly *Myotis* and *Plecotus* species) which are difficult or just plain impossible to distinguish. As an additional problem, not all species can be heard from a distance of a few dozen meters away (e.g. horseshoe bats). In spite of these restrictions, bat detector observations can be an interesting addition to other survey methods. Some species, such as European free-tailed bat, are usually not captured in mist nets while other species, such as Common pipistrelle, are practically never found in empty buildings (at least not in visible locations). By surveying with detectors from slow-moving cars, information can be gathered which the previous methods fail to yield.

A few surveys were organized, involving a drive down a number of roads. In some locations along waterways, a stop was made to listen for bats for some time. On a total of approximately 40 kilometers, 124 bats of five species were heard. Interestingly, the Common pipistrelle appeared far more numerous than reflected by e.g. mist netting results, although perhaps this is an artefact of the method. The European free-tailed bat is the only species which was only found by bat detector observation (in fact, it was even audible without a detector). Barbastelle bat was heard near the camp location. Coincidentally, a breeding colony of Common pipistrelles was found in the camp accommodation. A count of emerging bats yielded 52 individuals.

Species	Number of individuals observed
Pipistrellus pipistrellus	108
Nyctalus leislerii	6
Barbastella barbarstellus	1
Tadarida teniotis	6
Myotis daubentonii	3
TOTAL	**124**

Table 5.4 Number of bats observed by detector survey. The Pipistrelle bats of the breeding colony in the camp accommodation are not included in this table.

6 CAMERA TRAPS

by: Jan Wondergem

6.1 SURVEY METHOD

The use of camera traps has by now become a routine part of Field Study Group mammal surveys. In Galicia twelve camera traps were used. To achieve success in the relatively short period of the camp (10 days at maximum), many cameras are needed, and they need to be in the field for as long as possible. Therefore, the cameras were put into place at the very start of the summer camp. Almost everyone present at the camp participated in this, ginving them the opportunity to gain new experiences with the application of camera traps. The locations of the camera are displayed in figure 6.1.

To maximize the chances of recording animals, bait was used. Peanut butter on a small suspended block of wood was used almost everywhere, in combination with drops of a mixture of anise oil and fish oil. At one camera trap site, a wild boar, found as road-kill, was suspended from a rope in order to attract predators to the camera. Also, a tincture of valerian extract was sprayed at two camera trap sites.

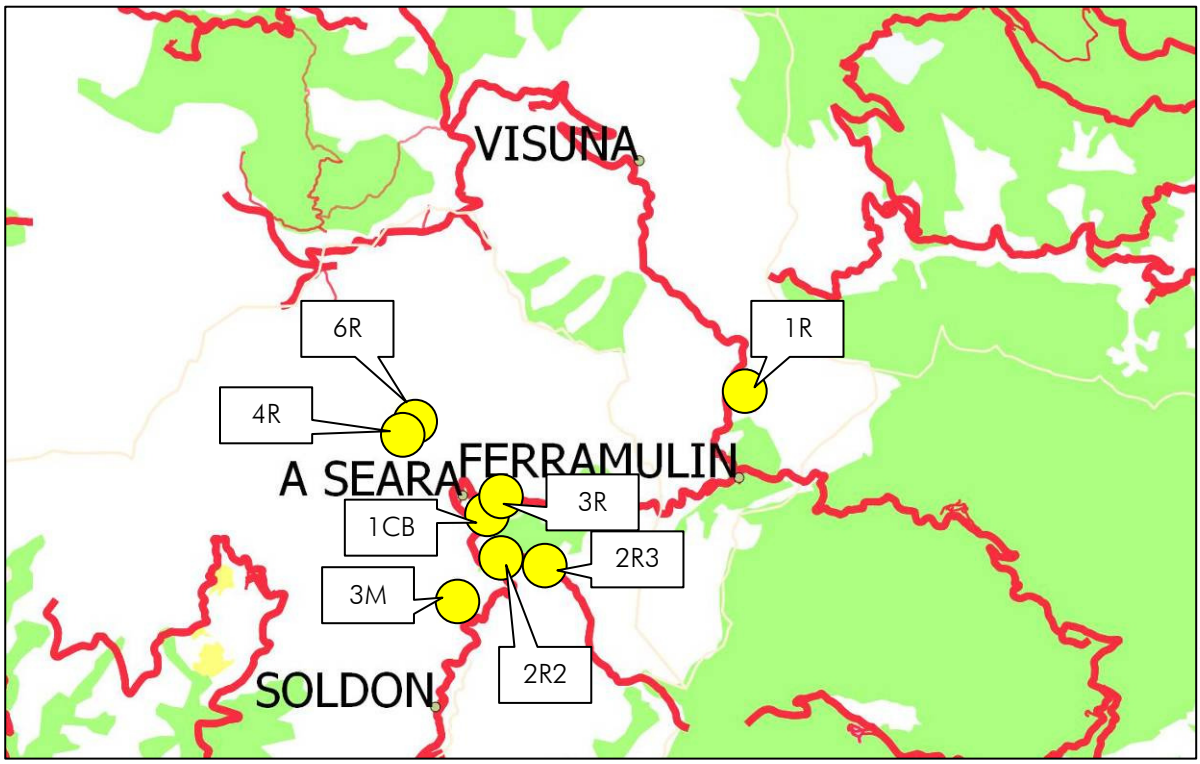


Figure 6.1 Camera trap locations.

6.2 RESULTS

The camera traps with positive results for mammals are given in table 6.1. In total 25 successful pictures were taken, displaying five different mammal species. They were Roe deer (4 individuals on 4 locations), Wolf (2 individuals on 1 location), Red fox (2 individuals on 2 locations), Wild boar (16 individuals on 4 locations) and Pine marten (1 individual). Some of the pictures that were taken by the cameras are displayed in the figures in this chapter. Two of the recorded species are discussed briefly: Wolf and Roe deer.

Location	Species	Number of individuals
1CB	*Capreolus capreolus*	1
1CB	*Sus scrofa*	1
1R	*Sus scrofa*	8
2R2	*Capreolus capreolus*	1
2R3	*Canis lupus*	2
3M	*Vulpes vulpes*	1
3R	*Capreolus capreolus*	1
4R	*Sus scrofa*	3
6R	*Capreolus capreolus*	1
6R	*Martes martes*	1
6R	*Sus scrofa*	4
6R	*Vulpes vulpes*	1

Table 6.1 Results at camera trap locations.

Figure 6.2 Results from the camera traps: Wild boar (Sus scrofa) *(upper left), Red fox* (Vulpes vulpes) *(upper right) and European Pine marten* (Martes martes) *(below).*

Wolf (*Canis lupus*)

As the camp proceeded, more and more signals were coming in that there might be a group of wolves in the vicinity of the camp accommodation. The signals included many (about 15) large droppings with many wild boar hairs in them. The initial plan was to lure the wolves to a surveyable part of the area where they might be observed with binoculars, but then a wild boar was found as road-kill. The carcass was suspended from a tree and a camera trap was placed near it. It did record a Roe deer, but no wolf.

Aided by an imitation of the howling of the alpha male by one of the camp participants, we gained insight in the approximate position of the pack during the day. At various trails in the vicinity camera traps were placed and checked for results after about 24 hours. On the last night of the camp, a positive result was achieved: two young wolves were recorded by a camera trap at location 2R3.

Figure 6.3 Young wolf (Canis lupus) *captured on camera at location 2R3.*

Roe deer *(Capreolus capreolus)*

The camera trap in location 6R was very successful. Besides once a Red fox, a Pine marten, four times a Wild boar and a Roe deer were recorded. The series of photographs in figure 6.4, showing a Roe deer which was probably startled by the tiny sounds of the camera trap, is in itself not remarkable. What is unusual is the escape route the animal chooses: after following the trail for a few meters, it makes a perpendicular turn and makes an enormous jump *uphill*, straight through difficult terrain overgrown with ferns and heather. Perhaps the best escape route in an area where wolves live?

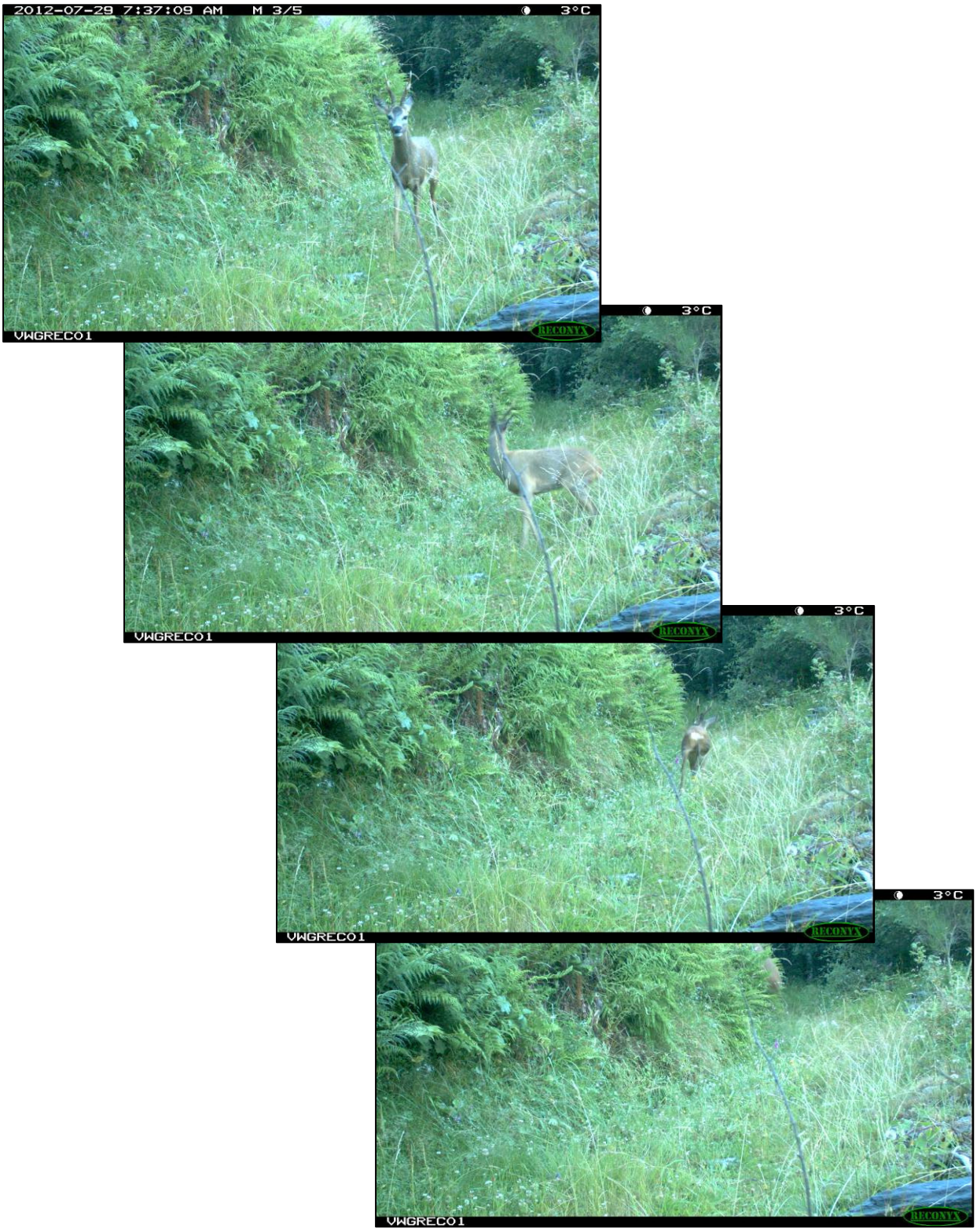


Figure 6.4 European roe deer (Capreolus capreolus) *running away from the camera.*

7 CATCHING DESMANS THE HOLY GRAIL

by: Karl van Ginderdeuren

Worldwide there exist only two species within the Desmaninae family: the Pyrenean desman *Galemys pyrenaicus* and the Russian desman *Desmana moschata*. Both are small semi-aquatic mammals, listed as vulnerable by the IUCN. The **Russian desman** is fairly widespread in southwest Russia but it is threatened by habitat loss and pollution. Once it was hunted for its fur, but it now enjoys a protected status in Russia. The **Pyrenean desman** occurs in mountain streams from the French Pyrenees to the Iberian peninsula. In all of the VZZ history, there is only one (famous) record of a Pyrenean desman being captured. But it escaped the trap before people could catch it. However, many people saw it already that night on the VZZ summer camp in Portugal, 2003. Trapping desman during this summer camp was to prove actual presence in several river systems around Seara and Ferramulin. There is little to nothing known about desman presence in the camp area.

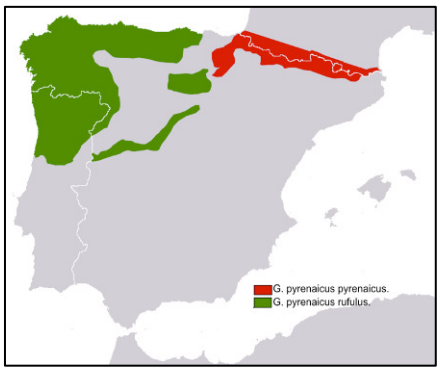
7.1 SPECIES DESCRIPTION

A Pyrenean desman measures 11-16cm with a tail of 12-16cm. It weighs 35 to 80g. Desmans use their long, sensitive snouts (ca. 20mm) to forage under stones and in mud to locate their prey. Desmans easily consume 30-50% of their body weight each day. They have large webbed hind feet (31-38mm) and can close their ears and nose whilst diving underwater. Average life expectancy is 3 (up to 5) years and females produce 1 or 2 litters a year. After 4-5 weeks the female gives birth to 1 to 4 offspring. Sexual maturity is reached after one year.

The desman's preferred habitat is fast flowing mountain streams, although it is occasionally found in slow moving water bodies such as canals, lakes and marshes. It favors perennial rivers where the margins offer some shelter, and requires clean and well oxygenated water. The Pyrenean desman is specialized to an aquatic environment. It feeds nocturnally on a variegated array of crustaceans and insect larvae, including stoneflies and caddis fly larvae. The French desman biologist Alain Bertrand analyzed thousands of desman droppings and has never found fish scales in them. This leads us to conclude that Pyrenean desmans do not eat fish. Desmans construct nests of dry grass and leafs in river banks, making use of natural holes or burrows made by other mammals (e.g. Water voles). One desman can make use of several burrows.

7.2 OCCURRENCE

This aquatic mole species is restricted to the Pyrenees as well as parts of northern and central Spain and northern Portugal. In France it occurs along the Aude, Agly, Salat, Aspe, Ossau, Ariège, Ardour, Tet and Tech rivers. In Portugal it occurs along the Minho, Ancora, Lima, Neiva, Cavado, Ave, Leca, Douro, Vouga, Mondego, and Tejo rivers. In Spain it is found in the upper reaches of rivers in the Pyrenees, the Cantabrian mountains, the Sistema Central, the Picos de Europa and along the Deva River. It also occurs in the Serra de Guarra north of Huesca and Infiesta, Oviedo, and Burguete, Navarro. It is found at altitudes between sea level and 2500 m. In Spain, the river systems in which the species occurs, flow into three different seas: Mediterranean, Atlantic and Cantabrian; hence the populations are all separated from each other.



Carlosbih – Wikimedia commons

Figure 7.1 Occurence of Galemys pyrenaeicus *subspecies.*

The population has declined in recent years, but it is hard to obtain precise estimates of population size and decline rate for this shy and secretive species. The occurrence of Desmans usually is established by collecting droppings, found on stones and boulders in the rivers. In favorable habitats population densities may be 5-10 individuals per kilometer, but such high densities are rare. In Spain the species has undergone marked declines in the central system and the desman has disappeared from some sites where it was previously known. In the Spanish Pyrenees and Cantabrian regions densities range from 2.8 to 7.3 animals per kilometer of river. In France the population is also declining.

This species is confined to a very vulnerable habitat in a restricted area. The most potent threats are from water pollution and habitat fragmentation, caused by the construction of hydro-electric plants, water extraction, and dam and reservoir construction. Other threats are direct persecution from fishermen who incorrectly believe this species to be a threat to fish stocks, especially trout. Further, American mink *(Neovison vison)* (invasive species in south of Europe) and Otters *(Lutra lutra)* locally predate on desmans. Climate change is anticipated to be a serious threat to the Pyrenean desman in the near future. The species tends to occur only in areas with annual rainfall superior to 1000 mm and, given climate change scenarios for Spain, by 2060 the species may be virtually extinct from central Spain and also from most of its important areas from northern Iberia.

7.3 SURVEY METHOD

The best way to study desman presence is to have skilled people collecting desman droppings. This goes much faster than trying to catch the animal itself. However, desman droppings resemble droppings of Dipper *(Cinclus cinclus)* and can be hard to find. Moreover, when there is regular rainfall like in Galicia, droppings are easily washed away by increasing water levels. In fast flowing river systems, steel eel traps are often used. Figure 7.2 shows French desman biologists placing these traps. Due to deeper waters in the surroundings of the summer camp, we opted for bigger tunnel traps, otherwise used to catch fish (figure 7.3). It was important to make sure that part of the trap is kept out of the water, for the animals not to drown. Traps were set at night and checked every 3 hours.

Photo: Karl van Ginderdeuren

Figure 7.2 French biologists using steel eel traps in 2011.

Photo: Karl van Ginderdeuren

Figure 7.3 Tunnel traps, used during the summer camp in 2012.

7.4 RESULTS

Already the first night René and Pieter-Jan were lucky during their desman shift. Desman in one of the traps. What happened next was one big desillusion. Stressed out (?) the desman quickly showed little signs of life. We tried to put it back on a stone and gave it at least half an hour to recover. No aquarium tricks or photoshoots were organized. I don't think we did anything wrong but yes, we killed it. I can't describe what it feels like to finally see the species you've been looking for during several years and subsequently see it die. We were in a bad frame of mind. Paulo assured us this dead desman would not go to waste: detailed measurements (showing it was very skinny), genetical and biochemical analyses will be performed, and the specimen will finally be stored in the national museum. The local biologists kept pushing us hard the next days to study more river systems and find desman presence. And yes, we captured two more desmans (see table 7.1). The way of trapping was exactly the same, and these two were very active (and aggressive). Sadly, on the last day of trapping another desman got entangled in the entrance of one of the traps during daytime, and died subsequently. Due to the high mortality rate and the fact that the main question had been answered, it was decided to stop using this trapping method before the end of the camp.

Location 1: near Ferramulin	Latitude	Longitude	Results
Trap 1 (closest to village)	42,574977	-7,056175	-
Trap 2	42,575032	-7,057001	-
Trap 3 (furthest)	42,574819	-7,057473	1 desman (25/07/2012); Died
Location 2: in garden of casa	**Latitude**	**Longitude**	**Results**
Trap 1 (closest to casa)	42,53160	-7,11627	-
Trap 2	42,53077	-7,11834	-
Trap 3	42,52995	-7,11915	1 desman (27/07/2012)
Trap 4 (furthest)	42,53156	-7,11576	-
Location 3: near Outeiro	**Latitude**	**Longitude**	**Results**
Trap 1	42,57263	-7,09247	-
Trap 2	42,57235	-7,09182	-
Trap 3	42,57203	-7,09108	-
Trap 4	42,57168	-7,08992	1 desman (28/07/2012)
Trap 5	42,53146	-7,11683	1 desman (29/07/2012); Died
Trap 6	42,53133	-7,11788	-
Trap 7	42,53005	-7,11962	-

Table 7.1 Results of the survey with desman traps.

7.5 CONCLUSION

We can only conclude that desmans are present in the river systems around Ferramulin and Outeiro, but that one has to be very careful when trapping them. Check the traps thoroughly, release captured animals immediately and make sure the nets are completely sealed or out of the water during the daytime. An opening of 1-2cm is enough for a desman to become entangled and drown.

Photo: Karl van Ginderdeuren

Figure 7.4 One of the Pyrenean desmans (Galemys pyrenaeicus) *that met an unfortunate fate.*

Photo: Karl van Ginderdeuren

Figure 7.5 Close up of the Pyrenean desman (Galemys pyrenaeicus).

8 EXPERIENCE WITH WOLVES

by: Lily Vercruijsse

We knew on beforehand from a literature search that wolfs occur in Galicia. They prefer areas with a low human population density, large numbers of hoofed mammals and terrain which is inaccessible to man (Llaneza et. al. 2012). Among other factors, large populations of hoofed mammals make their presence in Galicia possible (Barja 2009). During the initial surveys of tracks and signs, some scats were found which had many hairs and grey-coloured remains in them. At first, these were believed to be droppings of domestic dogs, mainly since they were found at close distance to the village where we were staying. When more droppings were found, they were studied more closely and we concluded that in fact they were wolf scats (see figure 8.1).

This finding motivated us to post two people along a trail where possible wolf tracks had been found. All kinds of sounds were heard that night, most probably produced by wild boars, but there was no sign of wolves. To test their presence, another talent was thrown into battle: we hoped an imitation of a wolf call would induce a reaction from wolves in the area. An answer was heard almost immediately, coming from the mountain to the left of us. Juvenile wolves reacted with a yapping sound very much like the one young dogs produce. Mature wolves in their turn immediately started howling from the other side of the valley.

Exhilarated by this experience, the whole group then decided to climb up that side of the mountain the very next morning at dawn (see figure 8.2), hoping to catch a glimpse of mature wolves. Partly due to the fog that morning, this proved tobe unsuccessful, though as a solace we did witness a fine sunrise.

Determined to see wolves, two of us left two hours before dark, packed and ready to spend the night on the mountain. We chose a trail which led to the mountain where the calls of juvenile wolves had been heard. Many scats were found here too, suggesting the trail might lead to a den. Wolves mark their territorial borders with scats in prominent places above ground level, but near the den the scats are random, out of plain sight and at ground level (Barja 2005). This was a second clue that the den might be near. Just out of sight from the main road, we were completely surprised by two juvenile wolves who were in the middle of the trail. The sense of surprise was mutual, but the animals remained long enough for us to take a camera from a backpack and take a few photographs (figure 8.3).

Photo: Lily Vercruijsse

Figure 8.1 Wolf droppings.

After they had left, we were left with a sense of euphoria. We continued our tour hoping to experience this once more. The setting was just right, a clear sky and full moon with just the silhouette of a howling wolf missing from it. We didn't have another sighting that night, but we did get answers to our mock-calls. Our enthusiastic report back at the camp accommodation stimulated all people present there to climb the same mountain on the last night of camp. Spread along parts of the trails, we did in the end see two juvenile wolves, in all likeness the same two. Pity it was the last day!

Photo: Lily Vercruijsse

Figure 8.2 Waiting desperately for a wolf sighting.

Photo: Kees Mostert

Figure 8.3 Young wolf (Canis lupus) *on the path.*

9 OTHER MAMMAL OBSERVATIONS

by: Kees Mostert

Besides the survey methods described previously in this report (camera-traps to record larger mammals, live traps to catch small mammals and mist nets and detectors for bat research) a considerable number of casual sightings, droppings and observations of tracks were recorded. In this chapter a summary is given of these observations. They are also displayed in table 1, in the summary of this report (page 6).

Hedgehog *(Erinaceus europaeus)*

Seven sightings and a single find of a dead animal (traffic victim) were recorded. Practically all sightings were during the night.

Iberian shrew *(Sorex granarius)*

Two individuals were captured in live traps. Furthermore, the Iberian shrew was found in owl pellets (11 individuals at Bustelo de Fisteus, and 12 individuals at Vesarredonda).

Eurasian pygmy shrew *(Sorex minutus)*

The Eurasian pygmy shrew was found only in owl pellets during the summer camp (1 individual at Bustelo de Fisteus and 3 individuals at Vesarredonda)

Photo: Karl van Ginderdeuren

Figure 9.1 Iberian shrew (Sorex granarius).

Greater white-toothed shrew *(Crocidura russula)*

The Greater white-toothed shrew too was found only in owl pellets (38 individuals at Bustelo de Fisteus and 8 individuals at Vesarredonda).

Lesser White-toothed Shrew *(Crocidura suaveolens)*

The Lesser White-toothed Shrew too was found only in owl pellets. In all, skull remains of 13 individuals were found (8 individuals at Bustelo de Fisteus and 5 individuals at Vesarredonda).

Pyrenean desman *(Galemys pyrenaicus)*

At three different locations, a total of four desmans was captured

Spanish mole *(Talpa occidentalis)*

In meadows around our camp accommodation, mole hills were found at various sites. Furthermore, a freshly killed individual was found and also a traffic victim. One was found in an owl pellet from Bustelo de Fisteus.

Lesser horseshoe bat *(Rhinolophus hipposideros)*

Inspection of abandoned buildings proved somewhat succesful in finding this species. No less than three groups of 23, 10 and 10 Lesser horseshoe bats were found in attics. At a nearby location, dozens of droppings of this species were found, but the animals were not present. However, a solitary Geoffroy's bat was.

Alcathoe whiskered bat *(Myotis alcathoe)*

Three individuals of *Myotis alcathoe* were captured in mist nets at two different locations. Two of these were females, and one was a male. The species also was recorded by batcorder five times.

Daubenton's bat *(Myotis daubentonii)*

This species was recorded by sightings, bat detector observations and other signs. Mistnetting gave a total of 16 catches of Daubenton's bats, making it the most frequent mistnet capture after Common and Savi's pipistrelle. Of the captured Daubenton's bats, only one was a female. With bat detectors, a few foraging individuals were observed over streams and in a cave a group of about 30 individuals was found.

Geoffroy's bat *(Myotis emarginatus)*
One sighting was recorded of a solitary individual in a building near Vesarredonda. Another individual was captured in a mistnet, placed in front of the open door of a little old house in the forest. One recording of this species was made by a batcorder.

Whiskered bat *(Myotis mystacinus)*
The presence of this species was established exclusively through the use of mistnets (four individuals).

Escalera's bat *(Myotis escalerai)*
The presence of this species was established through captures in mistnets (one individual; figure 9.2). It was also recorded by a batcorder.

Myotis spA
Myotis spA is the name which is used to indicate a recently discovered bat species, which is closely related to Escalera's bat (*Myotis escalerai*). Sofar, within Galicia the species was only known from the watersheds of the rivers Niava and Eume. The mistnet capture can therefore rightly be called spectacular.

Photo: Jan Buys

Figure 9.2 Escalera's bat (Myotis escalerai).

Common pipistrelle *(Pipistrellus pipistrellus)*
Already during the first night, a colony of Common pipistrelles was discovered at the back side of our accommodation. The next night, more than 50 bats were counted leaving the roost. During the bat detector surveys, the Common pipistrelle was by far the most common bat species (accounting for about 80% of all observations). The mistnet surveys gave a total of 24 captures of the species. During a bat detector survey, a low-flying individual was mysteriously captured in the grille of one of our cars.

Savi's pipistrelle (*Hypsugo savii*)
No less than 30 individuals of Savi's pipistrelle were captured in mistnets, making it by far the most abundant species among mistnet captures. This was probably caused in part by the selection of mistnet sites. During the bat detector surveys along some roads, the species ratio was very different (no Savi's but 108 Common pipistrelles). Savi´s pipistrelles were also recorded by batcorder five times.

Leisler's bat (*Nyctalus leislerii*)
Mistnetting yielded four captures of Leisler's bats. A further six foraging individuals were observed during bat detector surveys, two of them near our accommodation.

Serotine (*Eptesicus serotinus*)
Bat detector surveys yielded a foraging Serotine in the surroundings of our accommodation. Mistnetting yielded a single capture.

Barbastelle (*Barbastella barbarstellus*)
The presence of the Barbastelle in the area was established through the use of mistnets. Five individuals were captured. A further single observation was recorded with a bat detector in the immediate vicinity of our accommodation, and five individuals were recorded by batcorder as well.

Common long-eared bat (*Plecotus auritus*)
Through inspection of abandoned buildings, one sighting of a single Common long-eared bat was recorded in Orejudo Dorado. Mistnetting also yielded a single capture of a Common long-eared bat. Bat detector surveys gave twi observations of an unidentified long-eared bat.

Grey long-eared bat (*Plecotus austriacus*)
Two Grey long-eared bats were captured in mistnets (as well as one Common long-eared bat).

Schreiber's bat (*Miniopterus schreibersii*)
This species was recorded four times by a batcorder. It was also sighted in a cave once, but unfortunately the observer failed to register the co-ordinates of the location. No Schreiber's bats were captured in mistnets.

European free-tailed bat (*Tadarida teniotis*)
During some of the bat detector surveys, European free-tailed bats in flight were heard at five locations. Also, several sounds that were recognisable by human ears were recorded. As usual, sounds were the only way by which the presence of this species was established.

Broom hare (*Lepus castroviejoi*)
A special excursion to a mountainous area 70 km northeast of the Courel area was organized on July 30th to find the obscure Castroviejoy's or Broom hare, a hare species endemic to few mountainous areas in Spain's North west. It proved to be no easy task to get to see the species. Although small piles of droppings were readily found on the spot, there were initially no sightings. Apparently, Broom hares are active mostly after sunset and then sometimes show themselves. It took some of us until 23:30 to get to see one. The density at which the species occurs appears to be low. Once captured in the light, they proved easy to approach. Once among the broom bushes however, they were quickly lost from sight.

Photo: Kees Mostert

Figure 9.3 Broom hare (Lepus castroviejoi) *spotted on a path.*

Bank vole (*Myodes glareolus*)
The Bank vole was only found in owl pellets (Vesarredonda one individual). The species occurs at the edge of its distribution area here.

Southern water vole (*Arvicola sapidus*)
The Southern water vole was only found in owl pellets (Vesarredonda three individuals).

Field vole (*Microtus agrestis*)
Two Field vole were captured in live traps at locations near our accommodation. Furthermore, a few Field voles were found in a batch of owl pellets from Vesarredonda (three individuals). This species is at the edge of its distribution area here.

Lusitanian pine vole (*Microtus lusitanicus*)
The Lusitanian pine vole was only found in owl pellets. In a batch from Bustelo de Fisteus, no less than 40 skull remains were found, making it the most common mammal after the Wood mouse. The number in Vesarredonda was considerably lower (12 individuals).

European Snow Vole (*Chionomys nivalis*)
Snow voles were captured three times in live traps, all at a trapping site with large boulders. The Snow vole is not easy to catch and was captured only few times before during Field Study Group camps.

Yellow-necked wood mouse (*Apodemus flavicollis*)
Two Yellow-necked wood mice were captured in the vicinity of our accommodation. One was captured near Ferramulin. Furthermore, quite many were found in owl pellets from Bustelo de Fisteus and Vesarredonda. This species is at the edge of its distribution area here.

Wood mouse (*Apodemus sylvaticus*)
The Wood mouse was by far the most captured small mammal species during our summer camp. A total of 60 individuals was captured. In owl pellets, the Woodmouse was the most common mammal too (60 individuals at Bustelo de Fisteus and 44 individuals at Vessaredonda).

Algerian mouse (*Mus spretus*)
During the last morning of our camp, a recently dead Algerian mouse was found at our camp location. Another was found in a batch of owl pellets from Vesarredonda.

Edible dormouse (*Glis glis*)
Unfortunately, no Edible dormice were captured in the tree-traps we placed. There were some sightings and Edible dormice were heard. No Edible dormice were found in owl pellets.

Garden dormouse (*Eliomys quercinus*)
Garden dormice were captured in live traps five times.

Photo: Karl van Ginderdeuren

Figure 9.4 Garden dormouse (Eliomys quercinus).

Wolf (*Canis lupus*)
Many tracks and signs of wolves were found, and they were heard and, in the end, sighted (see description elsewhere in this report). They were also recorded by our camera traps. The animals were present at no more than a few kilometres from our camp location.

Red fox (*Vulpes vulpes*)
Foxes were seen twice near our camp location. Furthermore, tracks and signs (prints and droppings, among others) were found. Red fox was also recorded by two camera traps.

Weasel (*Mustela nivalis*)
A Weasel was sighted in the broad surroundings of our accommodation and some droppings were found which, based on their size, were probably Weasel droppings.

European pine marten (*Martes martes*)
A subadult pine marten was seen during the early evening on a road some 15 kilometers North east of our accommodation and observed for several minutes at a mere few meters distance behind some tree stumps. One pine marten was recorded by a camera trap.

European Badger (*Meles Meles*)
Badgers were sighted in the evening of July 26th during a bat excursion at approximately 10 kilometers east of our accommodation. In addition, signs of badger presence were found in various places.

European Otter (*Lutra lutra*)
No sightings, but a few spraints were found on rocks in the stream near our accommodation.

Common genet (*Genetta genetta*)
In abandoned buildings at four locations, Common genet droppings were found. Unfortunately, there were no sightings of the species.

Wild boar (*Sus scofra*)
Wild boars with young were recorded several times with camera traps. Tracks were found at various locations. In addition, Wild boars were sighted several times in the broad surroundings of our accommodation. In the vicinity of Vesarredonda, a Wild boar killed by traffic was found along a road. This was then used a wolf-bait at a camera trap site, unfortunately without success.

European roe deer (*Capreolus capreolus*)
Roe deer were fairly common in our study area. They were sighted many times and tracks and signs were commonly found. The camera traps also recorded several Roe deer and once Roe deer was even served for dinner at the local restaurant.

10 OTHER TAXONOMIC GROUPS

by: Kees Mostert

In this chapter you will find a brief overview of other species groups observed during the camp in the Serra do Courel. As with the mammals observed, hundreds of sightings of these species were collected. They are discussed briefly here, since the camp was mainly focused on mammals.

10.1 BIRDS

A total of 84 bird species was observed during the camp. Many Mediterranean species were absent in the mountainous Serra do Courel. These warmth-loving species are often not found in the higher and wetter regions of Northwest Spain. To the extent they do occur, they are observed especially in the lower regions. This concerns species such as Red-legged partridge, Subalpine Warbler and Black starling. Species like Sardinian Warbler and Eurasian scops owl were not found at all. Many species occurring in Serra do Courel are common in the Atlantic, more temperate parts of Europe. These are species such as Skylark, Blackcap warbler, Wren, Dunnock, Robin, Dartford warbler, Stonechat and Eurasian linnet. Along the streams, Grey wagtail and Dipper were present. Montane species too are mostly absent in Serra do Courel. On scree slopes and granite rocks, Black redstart and Rock bunting were regularly seen. In the northern part of Serra do Courel, where there is more farmland, species like Yellowhammer were found.

By Spanish standards, the number of raptor species observed was rather low. In most cases the species concerned were Common buzzard or Honey buzzard, although once in a while a Golden eagle, Short-toed eagle or Booted eagle was seen. Species such as White stork, Red kite, black kite and Crested lark were mainly seen during trips to and from Serra do Courel. Tawny pipit was present in the area where the Broom hare was seen. Tawny owls were common and could be heard during the night in most forests. A Barn owl was observed once and pellets of the species were collected in two villages.

English name	Dutch name	Scientific name
Barn owl	Kerkuil	Tyto alba
Bee-eater	Bijeneter	Microps apiaster
Black kite	Zwarte wouw	Milvus migrans
Black redstart	Zwarte roodstaart	Phoenicurus ochruros
Blackcap	Zwartkop	Sylvia atricapilla
Blue tit	Pimpelmees	Parus caeruleus
Booted eagle	Dwergarend	Hieraaetus pennatus
Carrion crow	Zwarte kraai	Corvus corone
Cetti's warbler	Cetti's zanger	Cettia cetti
Chaffinch	Vink	Fringilla coelebs
Cirl bunting	Cirlgors	Emberiza cirlus
Coal tit	Zwarte mees	Periperus ater
Common blackbird	Merel	Turdus merula
Common buzzard	Buizerd	Buteo buteo
Common chiffchaf	Iberische Tjiftjaf	Phylloscopus collybita
Common kestrel	Torenvalk	Falco tinnunculus
Common raven	Raaf	Corvus corax
Common sandpiper	Oeverloper	Actitis hypoleocus
Common swift	Gierzwaluw	Apus apus
Crag martin	Rotszwaluw	Pyonoprogne rupestris
Crested lark	Kuifleeuwerik	Galerida cristata
Crested tit	Kuifmees	Parus cristatus
Dartford warbler	Provencaalse grasmus	Sylvia undata
Dipper	Waterspreeuw	Cinclus cinclus
Dunnock	Heggemus	Prunella modularis
Eurapean serin	Europese kanarie	Serinus serinus
Eurasian bullfinch	Goudvink	Pyrrhula pyrrhula
Eurasian collared dove	Turkse tortel	Streptopelia decaocto

Eurasian greenfinch	Groenling	Carduelis chloris
Eurasian jackdaw	Kauw	Corvus monedula
Eurasian Jay	Gaai	Garrulus glandarius
Eurasian linnet	Kneu	Carduelis cannabina
Eurasian sparrow-hawk	Sperwer	Acciptter nisus
Eurasian swallow	Boerenzwaluw	Hirundo rustica
Eurasian tree sparrow	Ringmus	Passer montanus
European green woodpecker	Groene specht	Picus viridis
European nightjar	Nachtzwaluw	Caprimulgus europaeus
European stonechat	Roodborsttapuit	Saxicola rubicola
Europian goldfinch	Putter	Carduelis carduelis
Europian robin	Roodborst	Erithacus rubecula
Garden warbler	Tuinfluiter	Sylvia borin
Goldcest	Goudhaantje	Regulus regulus
Golden eagle	Steenarend	Aguila chryssaetos
Golden oriole	Wielewaal	Oriolus oriolus
Great grey shrike	Zuidelijke klapekster	Lanius excubitor
Great spotted woodpecker	Grote bonte specht	Dendrocopos major
Great tit	Koolmees	Parus major
Grey heron	Blauwe reiger	Adrea cinerea
Grey wagtail	Grote gele kwikstaart	Motacilla cinerea
Hen harrier	Blauwe kiekendief	Circus cyaneus
Honey buzzard	Wespendief	Pernis apivrous
House martin	Huiszwaluw	Delichon urbica
House sparrow	Huismus	Passer domesticus
Little owl	Steenuil	Athene noctula
Long-tailed tit	Staartmees	Aegithalos caudatus
Magpie	Ekster	Pica pica
Mallard	Wilde eend	Anas platyrhynchos
Mistle thrush	Grote lijster	Turdus viscivorus
Montagu's harrier	Grauwe kiekendief	Circus pygargus
Nuthatch	Boomklever	Sitta europaea
Red kite	Rode wouw	Milvus milvus
Red-backed shrike	Grauwe klauwier	Lanius collurio
Red-legged partridge	Rode patrijs	Alectoris rufa
Rock bunting	Grijze gors	Emberiza cia
Rock dove	Rots/tamme duif	Columba livia
Short-toed eagle	Slangenarend	Circaetus gallicus
Skylark	Veldleeuwerik	Alauda arvensis
Song thrush	Zanglijster	Turdus philomelos
Spotlees starling	Zwarte spreeuw	Sturnus unicolor
Spotted flycatcher	Grauwe vliegenvanger	Muscicapa striata
Subalpine warbler	Baardgrasmus	Sylvia cantillans
Tawny owl	Bosuil	Strix aluco
Tawny pipit	Duinpieper	Anthus campestris
Tree pipit	Boompieper	Anthus trivalis
Treecreeper	Boomkruiper	Certhia brachydactyla
White stork	Ooievaar	Ciconia ciconia
White wagtail	Witte kwikstaart	Motacilla alba
Whitethroat	Grasmus	Sylvia communis
Wood lark	Boomleeuwerik	Lullula arborea
Wood pigeon	Houtduif	Columba oenas
Wren	Winterkoning	Troglodytes troglodytes
Yellowhammer	Geelgors	Emberiza citrinella
Zitting cisticola	Graszanger	Cisticola juncidis

10.2 AMPHIBIANS AND REPTILES

Seven amphibian species and nine reptile species were found in the study area. During night-time excursions, large individuals of Common toad were found regularly, as well a the local Iberian frog and now and then a Schreiber's green lizard. Various waterholes and – reservoirs, chosen as locations for mistnetting sessions, were found to house juvenile newts and salamanders, such as Fire salamander and Bosca's newt. In the glacial lake at higher elevation Marbled newt and Tree frog were found. During the broom hare survey, a small number of calling Common midwife toads were heard (and seen). On dry-stone walls along roads, in villages and on rocky outcrops mainly Iberian rock lizards were present.

Photo: Jan Buys

Figure 10.1 Common toad (Bufo bufo).

Snakes were remarkably often found as traffic victims. Most were Smooth snakes, but Southern smooth snake, Ladder snake and Montpellier snake were also found. Among the most spectacular observations was one of an adult Ladder snake on the attic of an empty house in the mostly deserted village of Bustelo de Fisteus. A group of Lesser horseshoe bats was also present in the attic, which may have had the snake's attention. Seoane's Viper, an endemic to Northern Spain, was found once as a traffic victim and both Grass snake and Viperine snake were observed here and there. Viperines snakes were seen repeatedly underwater in streams.

English name	Dutch name	Scientific name
Bosca's newt	Spaanse watersalamander	Lissotriton boscai
Common midwife toad	Vroedmeesterpad	Alytes obstetricans
Common toad	Gewone pad	Bufo bufo
European tree frog	Boomkikker	Hyla arborea
Fire salamander	Vuursalamander	Salamandra salamandra
Iberian frog	Spaanse beekkikker	Rana iberica
Marbeled newt	Marmersalamander	Triturus marmoratus

English name	Dutch name	Scientific name
Baskian viper	Gallicische adder	Vipera seoanei
Carbonell's wall lizard	Carbonell's muurhagedis	Podarcis carbonelli
Grass snake	Ringslang	Natrix natrix
Iberian emerald lizard	Spaanse smaragdhagedis	Lacerta schreiberi
Ladder Snake	Trapslang	Elaphe scalaris
Montpellier snake	Hagedisslang	Malpolon monspessulanus
Slow worm	Hazelworm	Anguis fragilis
Smooth snake	Gladde slang	Coronella austriaca
Southern smooth snake	Girondische gladde slang	Coronella girondica
Viperine snake	Adderringslang	Natrix maura

10.3 DIURNAL BUTTERFLIES

The Serra do Courel proved to be very rich in butterflies. During our stay, no fewer than 68 butterfly species were identified. The most unusual species were Spanisch purple hairstreak, Sierra blue and various erebia species, including the endemic Chapman's ringlet. In the direct vicinity of the camp accommodation in Seara, dozens of diurnal butterfly species could be found with ease. The most common species were Small skipper, Iberian marbled white, Gatekeeper and Meadow Brown. On the flowers of the abundant sweet chestnuts, Gatekeeper, Speckled wood, Pearly heath, Iberian marbled white and Comma were foraging frequently. Many other butterfly species were seen in the heterogeneous lower (forested) areas. Some of these species are the ones which are found in a large part of Europe, such as Scarce swallowtail, Ringlet, Clouded yellow, Large tortoiseshell and Lang's Short-tailed Blue. In the herb-rich edges of forests, surprisingly large numbers of Spanisch purple hairstreaks could be seen. Here and there Purple hairstreak and Ilex hairstreak were also present. In the higher, rockier and more open parts of the mountains, species such as Great banded grayling, Grayling, Large wall brown, Bath white, Southern brown argus, Dusky meadow Brown, False grayling and Lulworth skipper were found. Many fritillaries were present. Spanisch fritillary, Dark green fritillary and Silver-washed Fritillary were abundant. A Cardinal was seen once near our village. In the villages, on Stone buildings and on muddy patches Purple emperor and Spotted fritillary were found regularly. Other interesting species found were Black-veined White, Purple-shot copper, Turquoise blue, Large tortoiseshell and Mallow skipper.

English name	Dutch name	Scientific name
Adonis blue	Adonisblauwtje	Polyommatus bellargus
Bath white	Resedawitje	Pontia daplidice
Black-veined White	Groot geaderd witje	Aporia crataegi
Brimstone	Citroenvlinder	Gonepteryx rhamni
Cardinal	Kardinaalsmantel	Argynnis pandora
Chapman's ringlet	Asturische erebia	Erebia palarica
Chestnut heath	Roodstreephooibeestje	Coenonympha glycerion
Clouded yellow	Oranje luzernevlinder	Colias croceus
Comma	Gehakkelde aurelia	Polygonia c-album
Common blue	Icarusblauwtje	Polyommatus icarus
Dark green fritillary	Grote parelmoervlinder	Argynnis aglaja

Photo: Jan Buys

Figure 10.2 Esper's marbled white (Melanargia russiae).

Dingy skipper	Bruin dikkopje	Erynnis tages
Dusky heath	Bleek hooibeestje	Coenonympha dorus
Dusky meadow brown	Grauwe zandoog	Hyponephele lycaon
Esper's marbled white	Zuidelijk dambordje	Melanargia russiae
Essex skipper	Zwartsprietdikkopje	Thymelicus lineola
False grayling	Oranje steppevlinder	Arethusana arethusa
Gatekeeper	Oranje zandoog	Pyronia tithonus
Grayling	Heivlinder	Hipparchia semele
Great banded grayling	Witbandzandoog	Brintesia circe
Heath fritillary	Bosparelmoervlinder	Melitaea athalia
High brown fritillary	Adippevlinder	Argynnis adippe
Holly blue	Boomblauwtje	Celastrina argiolu
Iberian marbled white	Spaans Dambordje	Melanargia lachesis
Ilex hairstreak	Bruine eikenpage	Satyrium ilicis
Knaapweed fritillary	Knoopkruidparelmoervlinder	Melitaea phoebe
Lang's short-tailed Blue	Klein tijgerblauwtje	Leptotes pirihous
Large grizzled skipper	Groot dikkopje	Ochlodes venata
Large tortoiseshell	Grote vos	Nymphalis polychloros
Large wall brown	Rotsvlinder	Lasiommata maera
Large white	Groot koolwitje	Pieris brassicae
Lulworth skipper	Dwergdikkopje	Thymelicus acteon
Mallow skipper	Kaasjeskruiddikkopje	Carcharodus alceae
Meadow brown	Bruine zandoog	Maniola jurtina
Osiris blue	Zuidelijke dwergblauwtje	Cupido osiris
Painted lady	Distelvinder	Vanessa cardui
Peacock	Dagpauwoog	Inachis io
Pearl-bordered fritillary	Zilvervlek	Boloria euphrosyne
Pearly heath	Tweekleurig hooibeestje	Coenonympha arcania
Piedmont ringlet	Donkere erebia	Erebia meolans
Purple emperor	Grote weerschijnvlinder	Apatura iris
Purple hairstreak	Eikenpage	Neozephyrus quercus
Purple-shot copper	Violette vuurvlinder	Lycaena alciphron
Queen	Kleine parelmoervlinder	Issoria lathonia
Red admiral	Atalanta	Vanessa atalanta
Red-underwing Skipper	Kalkgraslanddikkopje cf.	Spialia sertorius
Ringlet	Koevinkje	Aphantopus hyperantus
Scarce swallowtail	Koningspage	Iphiclides podalirius
Sierra blue	Zuidelijke mansschildblauwtje	Plebejus pyrenaica
Silver studded blue	Heideblauwtje	Plebeius argus
Silver-washed fritillary	Keizersmantel	Argynnis paphia
Small copper	Kleine vuurvlinder	Lycaena phlaeas
Small heath	Hooibeestje	Coenonympha pampilus
Small Pearl-bordered fritillary	Zilveren maan	Boloria selene
Small skipper	Geelsprietdikkopje	Thymelicus sylvestris
Small tortoiseshell	Kleine vos	Aglais urticae
Small white	Klein koolwitje	Pieris rapae
Southern brown argus	Moors bruin blauwtje	Aricia cramera
Southern ringlet	Zuidelijke erebia	Erebia triavia
Southern white admiral	Blauwe ijsvogelvlinder	Limenitis reducta
Spanisch fritillary	Spaanse parelmoervlinder	Melitaea deione
Spanisch purple hairstreak	Essenpage	Laeosopis roboris
Spanish gatekeeper	Spaanse oranje zandoog	Pyronia bathseba
Speckled wood	Bont zandoogje	Pararge aegeria
Spotted fritillary	Tweekleurige parelmoervlinder	Melitaea didyma
Striped grayling	Gestreepte heivlinder	Hipparchia fidia
Turquoise blue	Turkoois blauwtje	Polymmatus dorylas
Wood white	Boswitje	Leptidea sinapis

10.4 DRAGONFLIES

A total of 13 dragonfly species were found in the study area. Most of the streams in the Serra do Courel are mostly overgrown by trees or shrubs. Where the structure of the forest is a little more open and more sunlight can penetrate, a few dragonfly species were present, such as Beautiful demoiselle, Large red damselfly and Common goldenring. At a glacial lake at higher altitude, species like Emerald damselfly were observed. Along the river Sol on the southern edge of the study area Banded demoiselle, Emperor dragonfly, Black-tailed skimmer, Green-eyed club-tail, White-legged damselfly and a few darter species were found. At a hydroelectric station, a population of Blue-eyes was present.

English name	Dutch name	Scientific name
Banded demoiselle	Weidebeekjuffer	Calopteryx splendens
Beautiful demoiselle	Bosbeekjuffer	Calopteryx virgo
Black-tailed skimmer	Gewone oeverlibel	Libellula cancellatum
Blue-eye (or Goblet-marked damselfly)	Kanaaljuffer	Erythromma lindenii
Common goldenring	Gewone bronlibel	Cordulegaster bontonii
Crepuscular hawker	Schemerlibel	Boyeria irene
Emerald damselfly	Houtpantserjuffer	Lestes viridis
Emperor dragonfly	Grote keizerlibel	Anax imperator
Green-eyed club-tail	Kleine tanglibel	Onychogomphus forcipatus
Large red damselfly	Vuurjuffer	Pyrrhosoma nymphula
Red-veinend darter	Zwervende heidelibel	Sympetrum fonscolombii
Southern darter	Zuidelijke heidelibel	Sympetrum meridionale
White-legged damselfly	Witte Breedscheenjuffer	Platycnemis latipes

10.5 OTHERS

Apart from the well-known species groups, records of a few other species were recorded. Among them were a few grasshopper species, crickets and nocturnal butterflies. It should be made clear that little attention was given to these insect groups.

Grasshoppers and crickets:

English name	Dutch name	Scientific name
Blue-winged Grasshopper	Blauwvleugelsprinkhaan	Oedipoda caerulescens
Blue-winged Locust	Kiezelsprinkhaan	Sphingonotus caerulans
Common field grasshopper	Bruine sprinkhaan	Chorthippus brunneus
Common green grasshopper	Wekkertje	Omocetus viridulus
Meadow grasshopper	Krasser	Chorthippus parallelus
Rattle grasshopper	Klappersprinkhaan	Psopus stridulus
Saddle-backed Bush-cricket	Zadelsprinkhaan spec.	Ephippiger spec.
Southern field-cricket	Zuidelijke veldkrekel	Gryllus bimaculatus
Wood cricket	Boskrekel	Nemobius sylvestris

A few moth species:

English name	Dutch name	Scientific name
Hummingbird hawk-moth	Kolibrievlinder	Macroglossum stellatarium
Jersey tiger-moth	Spaanse vlag	Euplagia quadripunctaria

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APPENDICES

APPENDIX 1 LIVE TRAP CAPTURES

Location	Date	Time	Species name	Life stage	Sexe	Remarks
A	25-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
A	25-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
A	25-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
A	25-07-2012	23:00	*Apodemus sylvaticus*	adult	male	sexual active
A	25-07-2012	23:00	*Apodemus sylvaticus*	adult	male	sexual active
A	26-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
A	26-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
A	26-07-2012	23:00	*Apodemus sylvaticus*	adult	female	lactating
A	26-07-2012	23:00	*Apodemus sylvaticus*	adult	male	sexual active
A	26-07-2012	23:00	*Apodemus sylvaticus CF*	adult	male	sexual active
A	26-07-2012	23:00	*Apodemus sylvaticus CF*	adult	female	lactating
A	27-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
A	27-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
A	27-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
A	27-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
B	25-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
B	25-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
B	26-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
B	26-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
B	26-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
B	26-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
B	26-07-2012	23:00	*Apodemus sylvaticus CF*	adult	male	sexual active
B	26-07-2012	23:00	*Apodemus sylvaticus*	adult	male	sexual active
B	26-07-2012	23:00	*Apodemus sylvaticus CF*	adult	male	sexual active
B	27-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
B	27-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
B	28-07-2012	07:00	*Apodemus sylvaticus*	adult		
B	28-07-2012	23:00	*Apodemus sylvaticus*	adult	male	
B	29-07-2012	07:00	*Apodemus sylvaticus*	adult	male	
B	29-07-2012	07:00	*Apodemus flavicollis*	adult		
B	29-07-2012	07:00	*Apodemus sylvaticus*	adult	male	
B	30-07-2012	12:00	*Apodemus sylvaticus*	adult		
B	30-07-2012	12:00	*Apodemus sylvaticus*	adult		
B	30-07-2012	12:00	*Apodemus sylvaticus*	adult	male	
B	30-07-2012	12:00	*Apodemus sylvaticus*	juvenile	male	
B	30-07-2012	12:00	*Apodemus sylvaticus*	juvenile	male	

Location	Date	Time	Species name	Life stage	Sexe	Remarks
C	25-07-2012	23:00	*Apodemus sylvaticus*	adult	male	sexual active
C	26-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
C	26-07-2012	16:00	*Apodemus sylvaticus*	adult	male	sexual active
C	26-07-2012	23:00	*Apodemus sylvaticus*	adult	male	sexual active
C	27-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
C	27-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
C	27-07-2012	07:00	*Apodemus sylvaticus*	adult	male	sexual active
C	27-07-2012	07:00	*Apodemus sylvaticus*	adult	female	sexual active
D	31-07-2012	22:30	*Apodemus sylvaticus*	adult	female	pregnant
D	01-08-2012	09:00	*Microtus agrestis*			
D	01-08-2012	23:00	*Apodemus sylvaticus*	adult	male	
D	01-08-2012	23:00	*Apodemus flavicollis*	adult	male	
D	02-08-2012	09:00	*Apodemus sylvaticus*	adult	female	
D	02-08-2012	09:00	*Apodemus sylvaticus*	adult	female	
E	30-07-2012	09:00	*Eliomys quercinus*			
E	30-07-2012	09:00	*Eliomys quercinus*			
E	30-07-2012	09:00	*Eliomys quercinus*	adult	female	
E	30-07-2012	16:00	*Eliomys quercinus*	juvenile		
E	30-07-2012	18:00	*Chionomys nivalis*	adult		
E	31-07-2012	22:30	*Chionomys nivalis*			
E	31-07-2012	22:30	*Eliomys quercinus*	subadult		
E	31-07-2012	22:30	*Chionomys nivalis*			
F	30-07-2012	11:00	*Apodemus sylvaticus*	adult	male	
F	30-07-2012	11:00	*Sorex granarius*	juvenile		
F	31-07-2012	10:30	*Apodemus flavicollis*	adult	female	
F	31-07-2012	22:30	*Apodemus sylvaticus*	adult	female	suckling
F	01-08-2012	09:00	*Sorex granarius*	adult		
F	01-08-2012	23:00	*Apodemus sylvaticus*	adult	male	

APPENDIX 2 MIST NET CAPTURES

RU = Right under arm length (mm)
LU = Left under arm length (mm)
W = Weight (gr)

Location	Date	Time	Species name	Sexe	RU	LU	W
Ferramulin 1	25-07-2012	23:55	*Myotis daubentonii*	male	35,9	35,40	9,0
Ferramulin 1	25-07-2012	00:15	*Myotis daubentonii*	male	38,0	38,00	10,5
Outeiro	26-07-2012	22:50	*Myotis daubentonii*	male	36,0	34,90	
Outeiro	26-07-2012	00:30	*Myotis daubentonii*	male	35,6	34,60	
Outeiro	26-07-2012	01:00	*Myotis alcathoe*	female	32,9	33,30	
Visuna	26-07-2012	22:28	*Pipistrellus pipistrellus*	male	29,2	29,00	4,5
Cruz do Outeiro	26-07-2012	23:20	*Pipistrellus pipistrellus*	male	30,1	30,30	4,8
Cruz do Outeiro	26-07-2012	00:20	*Myotis daubentonii*	male	35,1		6,5
Alto do Couto	27-07-2012		*Pipistrellus pipistrellus*	female	31,9	31,80	4,7
Alto do Couto	27-07-2012		*Hypsugo savii*	male	36,3	36,30	8,7
Alto do Couto	27-07-2012		*Hypsugo savii*	female	36,0	36,30	7,6
Alto do Couto	27-07-2012		*Hypsugo savii*	female	36,6	36,60	11,1
Alto do Couto	27-07-2012		*Hypsugo savii*	female	36,2	36,30	
Alto do Couto	27-07-2012		*Pipistrellus pipistrellus*	female	31,7	31,60	5,8
Alto do Couto	27-07-2012		*Hypsugo savii*	female	35,9	36,00	8,9
Alto do Couto	27-07-2012		*Hypsugo savii*	female	37,7	37,20	10,6
Alto do Couto	27-07-2012		*Hypsugo savii*				
Alto do Couto	27-07-2012		*Hypsugo savii*	female	36,7	36,40	9,6
Alto do Couto	27-07-2012		*Hypsugo savii*	male	32,1	31,90	6,7
Alto do Couto	27-07-2012		*Hypsugo savii*	female	37,7	37,60	9,8
Alto do Couto	27-07-2012		*Hypsugo savii*	female	35,5	35,40	8,8
Alto do Couto	27-07-2012		*Hypsugo savii*	female	35,6	35,80	8,6
Alto do Couto	27-07-2012		*Hypsugo savii*	female	37,5	37,20	10,5
Alto do Couto	27-07-2012		*Hypsugo savii*	female	34,6	34,50	7,9
Alto do Couto	27-07-2012		*Hypsugo savii*	male	34,2	34,10	6,9
Alto do Couto	27-07-2012		*Nyctalus leisleri*	male	43,7	43,80	15,9
Alto do Couto	27-07-2012		*Hypsugo savii*	male	32,2	31,90	7,1
Alto do Couto	27-07-2012		*Pipistrellus pipistrellus*	male	31,7	31,70	4,7
Alto do Couto	27-07-2012		*Hypsugo savii*	female	37,2	37,00	9,3
Alto do Couto	27-07-2012		*Hypsugo savii*	male	34,4	34,30	7,1
Alto do Couto	27-07-2012		*Hypsugo savii*	male	33,2	33,10	6,8
Alto do Couto	27-07-2012		*Hypsugo savii*	male	35,9	35,50	7,8
Alto do Couto	27-07-2012		*Hypsugo savii*	male	35,6	35,50	7,4
Alto do Couto	27-07-2012		*Eptesicus serotinus*	male	52,4	52,20	25,5
Alto do Couto	27-07-2012		*Nyctalus leisleri*	male	42,0	41,80	17,1

Location	Date	Time	Species name	Sexe	RU	LU	W
Alto do Couto	27-07-2012		*Myotis spA*	male	39,7	39,70	7,7
Alto do Couto	27-07-2012		*Hypsugo savii*	male	35,2	35,20	8,5
Alto do Couto	27-07-2012		*Hypsugo savii*	male	33,8	33,80	8,2
Alto do Couto	27-07-2012		*Hypsugo savii*	female	37,6	37,50	9,7
Alto do Couto	27-07-2012		*Hypsugo savii*	male	34,4	34,60	7,3
Alto do Couto	27-07-2012		*Myotis emarginatus?*				
Outeiro	27-07-2012	23:15	*Myotis alcathoe*	female	32,5	32,10	4,6
Outeiro	27-07-2012	23:15	*Myotis alcathoe*	male	31,1	31,40	5,0
Outeiro	27-07-2012	23:45	*Myotis daubentonii*	male	35,8	35,90	6,4
Seara 1	27-07-2012	23:55	*Barbastella barbastellus*	male	40,0		9,5
Seqeiro	28-07-2012	22:30	*Myotis mystacinus*	male	35,2	35,20	6,2
Seqeiro	28-07-2012	23:05	*Pipistrellus pipistrellus*	male	29,6	29,60	4,5
Seqeiro	28-07-2012	23:57	*Myotis mystacinus*				
Outeiro	28-07-2012	23:45	*Pipistrellus pipistrellus*	male		30,30	4,0
Outeiro	28-07-2012	00:25	*Pipistrellus pipistrellus*				
Outeiro	28-07-2012	00:25	*Barbastella barbastellus*				
Outeiro	28-07-2012	00:35	*Pipistrellus pipistrellus*	male		31,40	4,7
Outeiro	28-07-2012	00:35	*Myotis daubentonii*	male		35,60	
Outeiro	28-07-2012	01:05	*Barbastella barbastellus*	male		40,80	8,9
Outeiro	28-07-2012	02:20	*Plecotus austriacus*	female		40,90	9,2
Outeiro	28-07-2012	02:20	*Plecotus austriacus*	female		40,60	9,8
Ferramulin 2	28-07-2012	22:30	*Myotis emarginatus*	male	40,3		7,9
Ferramulin 2	28-07-2012	01:05	*Myotis daubentonii*	male	36,5	36,94	8,0
Rugando	29-07-2012	22:10	*Pipistrellus pipistrellus*	male	31,3	31,77	4,3
Rugando	29-07-2012	22:30	*Pipistrellus pipistrellus*	male	29,7	29,40	4,0
Rugando	29-07-2012	22:30	*Myotis daubentonii*	male	35,7	36,00	6,6
Rugando	29-07-2012	23:10	*Myotis daubentonii*	male	36,7	36,50	7,0
Rugando	29-07-2012	23:30	*Nyctalus leisleri*	male	44,1	43,90	15,4
Rugando	29-07-2012	23:40	*Hypsugo savii*	female	34,7	34,60	7,1
Rugando	29-07-2012	23:40	*Hypsugo savii*	female	35,1	34,90	9,0
Rugando	29-07-2012	00:20	*Pipistrellus pipistrellus*	male	30,4	30,40	4,2
Rugando	29-07-2012	00:20	*Myotis daubentonii*	male	37,7	37,70	8,1
Rugando	29-07-2012	01:45	*Myotis daubentonii*	male	37,4	37,10	8,0
Folgoso lower tank	29-07-2012	22:24	*Pipistrellus pipistrellus*	female	32,3	31,50	4,5
Folgoso lower tank	29-07-2012	22:30	*Pipistrellus pipistrellus*	male		29,40	4,4
Folgoso lower tank	29-07-2012	22:30	*Pipistrellus pipistrellus*	male		29,60	4,4
Folgoso lower tank	29-07-2012	22:40	*Hypsugo savii*	male	32,2	32,30	6,5

Location	Date	Time	Species name	Sexe	RU	LU	W
Folgoso lower tank	29-07-2012	22:55	*Pipistrellus pipistrellus*	male		30,60	4,7
Folgoso lower tank	29-07-2012	23:25	*Myotis escalerai*	male	38,7	38,50	6,9
Folgoso lower tank	29-07-2012	01:15	*Pipistrellus pipistrellus*	female	31,2	31,10	5,0
Folgoso lower tank	29-07-2012	01:45	*Pipistrellus pipistrellus*	male		31,80	4,2
Folgoso lower tank	29-07-2012	01:55	*Pipistrellus pipistrellus*	female		30,10	5,5
O Soldon	30-07-2012	00:10	*Barbastella barbastellus*	male	38,2	38,50	8,3
O Soldon	30-07-2012	22:30	*Barbastella barbastellus*				
Alto do Couto	31-07-2012	22:16	*Pipistrellus pipistrellus*				
Alto do Couto	31-07-2012	22:21	*Nyctalus leisleri*				
Alto do Couto	31-07-2012	22:23	*Hypsugo savii*	female	36,8	36,40	9,6
Alto do Couto	31-07-2012	22:50	*Hypsugo savii*	female	37,2	37,00	9,7
Alto do Couto	31-07-2012	22:50	*Plecotus auritus*	male	38,1	38,00	7,9
Alto do Couto	31-07-2012	22:43	*Pipistrellus pipistrellus*	female	32,5	32,40	5,5
Alto do Couto	31-07-2012	22:36	*Pipistrellus pipistrellus*	male	31,6	31,60	5,0
Seara 2	31-07-2012	22:25	*Pipistrellus pipistrellus*	female	32,9	32,92	5,8
Seara 2	31-07-2012	22:25	*Myotis mystacinus*	male	34,2	34,25	5,4
Seara 2	31-07-2012	01:30	*Myotis mystacinus*	male	34,6	34,68	5,0
Toca - A Enmida	01-08-2012	22:10	*Pipistrellus pipistrellus*	female		32,00	4,4
Toca - A Enmida	01-08-2012	22:30	*Myotis daubentonii*	female	36,3	36,24	7,2
Toca - A Enmida	01-08-2012	23:15	*Myotis daubentonii*	male	35,1	35,00	7,1
Toca - A Enmida	01-08-2012	23:30	*Myotis daubentonii*	male	35,8	35,60	5,8
Toca - A Enmida	01-08-2012	01:10	*Myotis daubentonii*	male	34,8	34,82	6,6