

Vereniging voor Zoogdierkunde
en Zoogdierbescherming



Mammal survey Alvão Natural Park Portugal



MAMMAL SURVEY

ALVÃO NATURAL PARK (PORTUGAL)

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José Nascimento remembered



Wednesday evening December 3rd, 2003, we were deeply shocked by the news of José Nascimento's untimely death. He was the great campaigner in the preparations for the VZZ Veldwerkgroep summer camp 2003 in Parque Natural do Alvão (NPA).

In the all too short period we knew him, José's enthusiasm was a great inspiration to us all. He welcomed each request for information or suggestion and his unique knowledge of the Park, its history and all forms of wildlife was truly amazing.

To José, the uncontested highlight of our visit was catching the Desman. His elation and pure joy at the sight of this extraordinary animal delighted us all.

We owe the success of our summer camp largely to José, his effectiveness as an organiser and his mood-enhancing presence. We regret the fact he will not see this report of our joint activities. José's death is a great loss to all those who love and strive to protect Nature in Portugal, especially his colleagues in the Park. To all of us, José Nascimento will always symbolize the remarkable combination of Portuguese cultural and natural elements typifying the Park. All participants remember him respectfully, in deep gratitude.

In name of all participants of the camp

- Portuguese participants
- Members of the VZZ Veldwerkgroep

Jan Boshamer

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PREFACE

Every year, the Dutch Field Study Group VWG (VZZ Veldwerkgroep) organises a field study abroad. In 2003, the field study took place in Portugal, in Alvão Natural Park, from July 26th till August 2nd, preceded by four days of introduction in order to reconnoissance the area and its species. Object of the camp was to register all mammal species within and just outside the Park. The camp was organised in close co-operation with the staff members of Alvão Natural Park.

In the Park's ecological centre at Arnal, the VZZ Veldwerkgroep was offered free accommodation by the staff. This graciously donated hospitality was soon used for sleeping, studying and socialising. The building, located high up the mountain over the village of Arnal, offers a spectacular view of Vila Real and the surrounding countryside. At night, observing the impressive amount of stars overhead and the lights of Vila Real below, we felt as if we were sitting in an aeroplane flying over the landscape.

Accommodation and weather conditions being perfect, although sometimes the heat was a bit much, the participants were able to collect a vast amount of data regarding the local fauna. By this year, many of the Dutch participants had become proud owners of a GPS (Global Positioning System) device. Fanatical use of these devices led to a more precise determination of sightings, caves, trap locations and the like. These gadgets were certainly useful.

Data collection focused on mammals, but as a sideline, a large amount of information was gathered about other fauna such as birds, amphibians, reptiles, butterflies and dragonflies. This report lists all species found during the survey, including locations.

We wish to thank the Dutch organisers, the board of the VZZ Veldwerkgroep, Hans Bekker in particular, for their many contributions to the effort. To our Portugal hosts, José Nascimento and Paulo Barros especially, we owe a deep debt of gratitude for their hospitality, their widespread knowledge and their indefatigable effort to turn the camp into a success.

Finally we would like to thank Helena Farrall and the students of the University of Lisbon for their enthusiasm and versatility. These young scientists were also excellent translators.

None of the Dutch participants, alas, could speak Portuguese. For this reason, one or two Portuguese students would usually go along on field trips and provide a helping hand whenever necessary.

All drivers were supplied with a permit. Additionally, every Dutch participant could show a personal explanatory letter in Portuguese. Both permit and letter were signed by the host organisation, Alvão Natural Park.

In wishing to thank all the contributors to the project's success, we include our hope our visit may have resulted in a better knowledge of mammals in the region and the enhancement of the protection of this unique nature reserve.

Sadly, massive destructive forest-fires in Portugal in 2003 have not passed over Alvão Natural Park. Soon after our departure both woodland areas and tilled land were ravaged. May the Park quickly recover.

Members of the VZZ Veldwerkgroep

Vereniging voor Zoogdierkunde en Zoogdierbescherming (VZZ)

Arnhem, the Netherlands, 2004

1 INTRODUCTION

This report contains the results of the workshop in Alvão Natural Park, a nature reserve in Portugal. The Park is situated in the north-eastern part of the country, near the regional capital of Vila Real. Map 1 indicates its location, while map 2 gives an overview of the park. During the period of study, July 26th till August 2nd 2003, a great many mammals were observed, including some rare species. As a sideline, insects, amphibians, reptiles and birds were observed. Contact with the Park staff was originated by Hans Bekker and Helena Farall.

Data registration was geared to observing Mice, Bats and other mammals. Special-interest objects of study were Wolves and the Pyrenean desman. An exhaustive study of the Park was impossible because of inaccessibility of some parts due to a lack of tracks of paths. Due to this reason, the north-eastern part of the Park remained virtually 'terra incognita'. Map 3 shows the grid cells where observations were made.

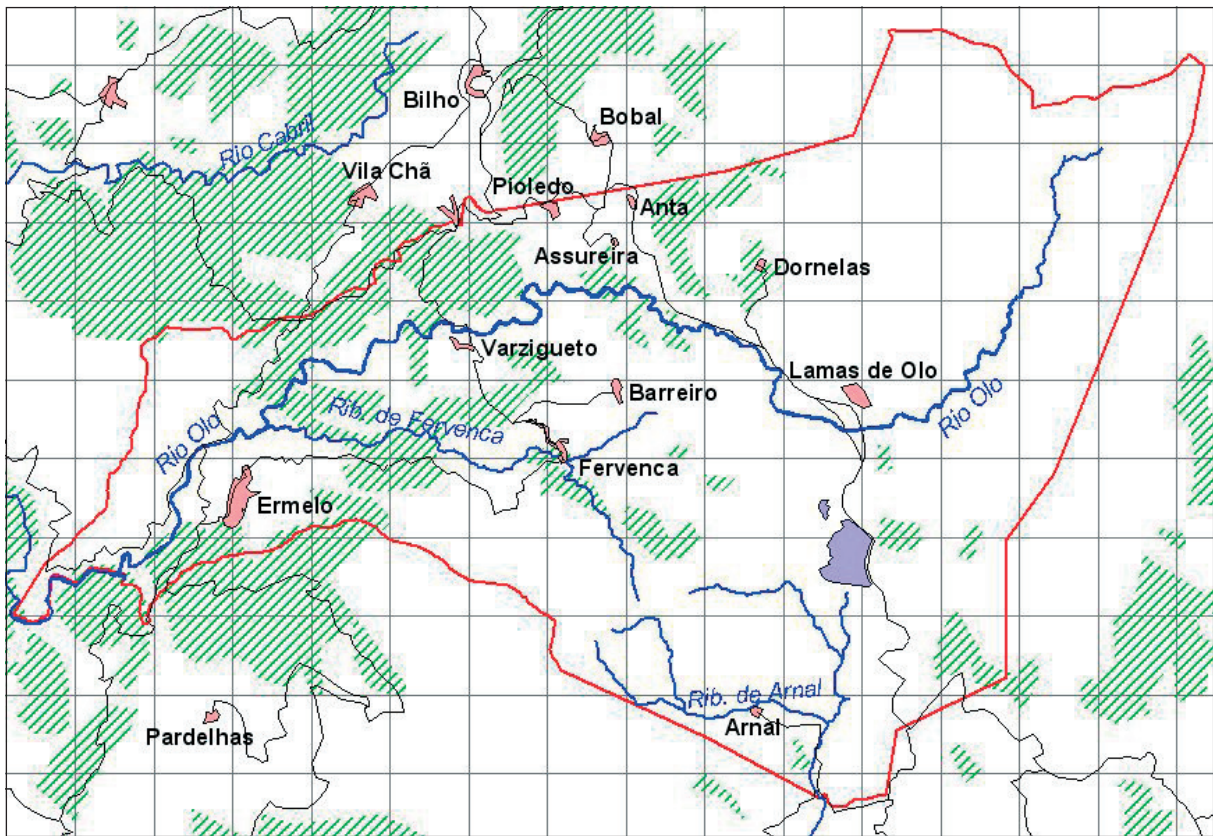
Chapter 2 contains a short description of the area. Chapter 3 describes the field study of bats, including a detailed account of methods used in this survey, such as scoop nets, bat detectors and a systematic search of the buildings called canastros, espigueiros or segueiros. These buildings, unique to the Iberian Peninsula's north-western part, were used for storing grain, greens and the like. Chapter 4 is about Mice. Longworth traps, Sherman traps and pitfalls were used. To catch the Iberian mole (*Talpa occidentalis*), known to live in the area, two especially designed wooden traps were used. To catch the Pyrenean desman (*Galemys pyrenaicus*), at the outset Sherman traps of two sizes were used, to no avail. The Portuguese supplied three fyke nets, which quickly proved successful, though labour-intensive. Other data regarding small mammals were collected by studying two sets of Owl pellets, as described in Chapter 5, which also includes data on animal casualties. Chapter 6 is about other mammal observations. Chapter 7 contains other relevant information on observations of birds, amphibians, reptiles, butterflies and dragonflies.

Year in, year out the collecting of data in order to write a report turns out to be a laborious effort. Once more, in 2003 interesting observation data were lost due to sloppy or nonexistent reporting. Standard forms were used to mark down specifics such as species, location, date, observer and peculiarities where applicable.

For the first time this year, GPS devices were an important element in the survey method. Location coordinates for every find could be converted into a GIS file used to draw maps. Thus more accuracy can be achieved. Using GPS devices demands experience, but their availability was seen as a great step forwards. In future surveys, we recommend the use of a GPS device on every excursion, tuned according to preconceived standards. Clear instructions regarding relevant coordinates and waypoints should be given in advance.

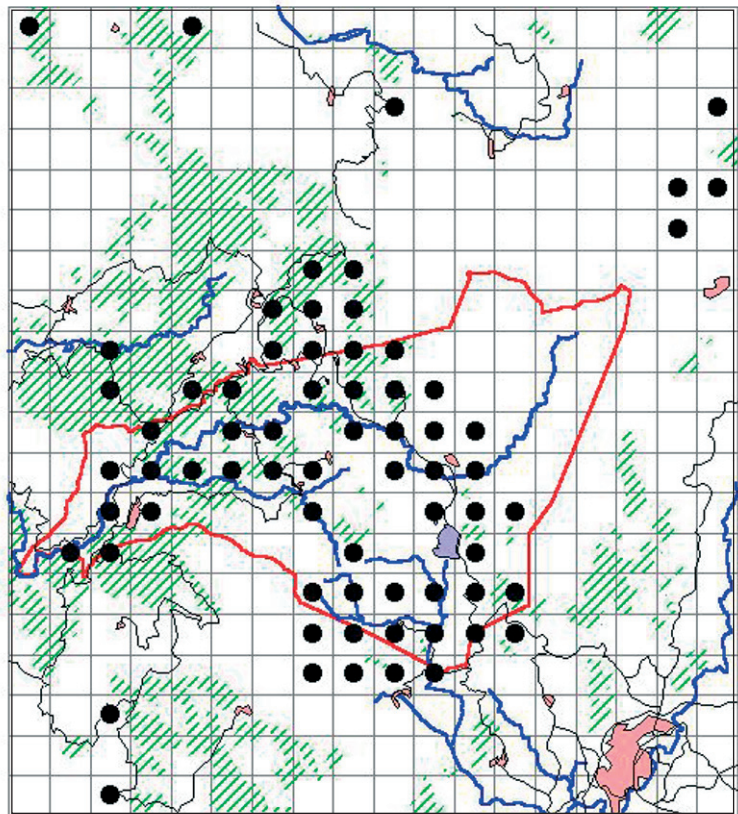


Map 1.



- Water reservoir
- Main road
- Village
- Main water course
- Parque natural do Alvão
- UTM-grid 1000 x 1000 meter
- Forest

Map 2, Upsite
Map 3, Right



2 DESCRIPTION OF THE AREA

Alvão Natural Park is situated in the north-eastern part of Portugal, just northwest of the city of Vila Real. It is situated in the provinces of Trás-os-Montes and Alto Douro, in the district of Vila Real, comprising Vila Real and Mondim de Basto councils. The Ecological Centre in the Park is located on a mountainside near Arnal village, accessible via a bumpy cobbled road.

The busy commercial town of Vila Real lies at the convergence of two rivers. The wine and port wine trade are predominant here. Vila Real's main feature is its fine 15th century Gothic cathedral, originally a church belonging to the Order of Dominicans, whose monastery was utterly destroyed in the 19th century, under suspicious circumstances.

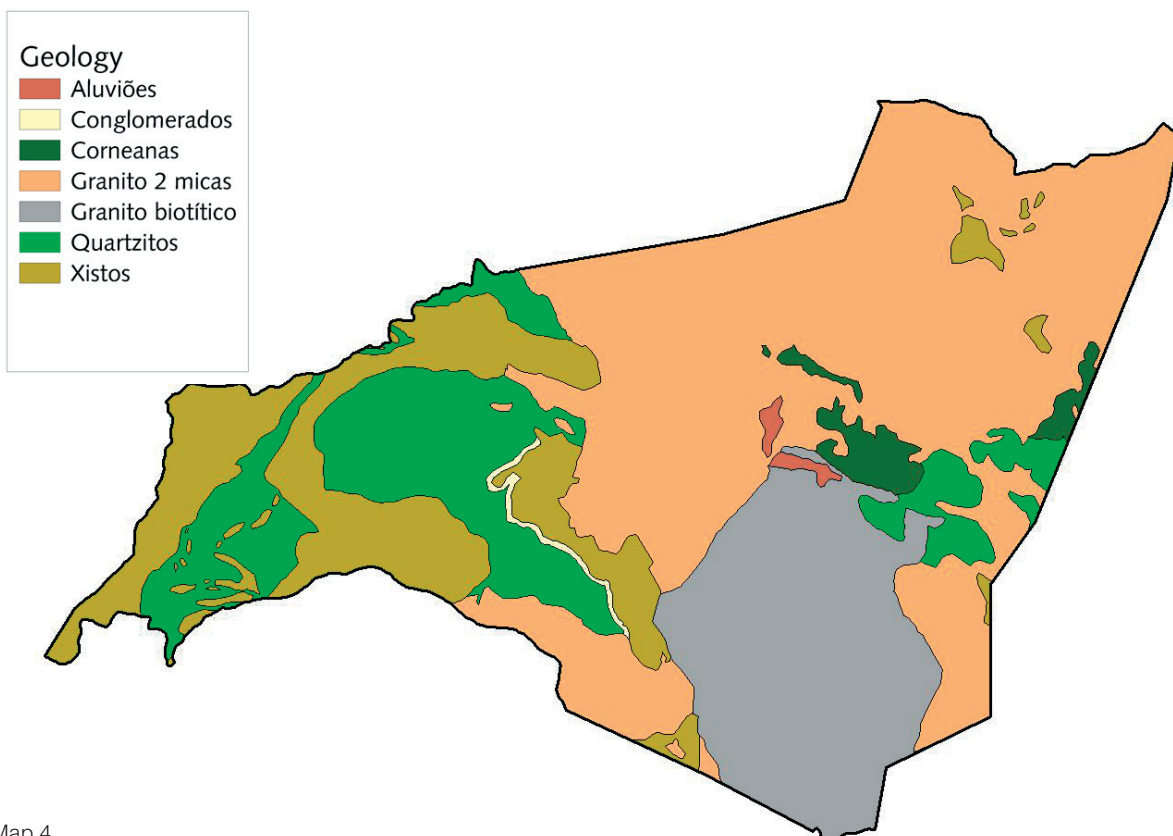
To the south of Vila Real flows the river Douro, where most of the port wine lodges have their 'Quintas'. In terraced vineyards, dominated by houses harking back to the 15th century, we find the origin of port wine.

Alvão Natural Park (map 2) a protected reserve since 1983, comprises approximately 7.220 hectares. It is the smallest reserve among natural and national parks in Portugal. However, it offers a diverse landscape, ranging from rugged, bare rock to wooded areas and lovely valleys, from well-cultivated dales to stark mountains reaching up to an altitude of 1.339 metres.

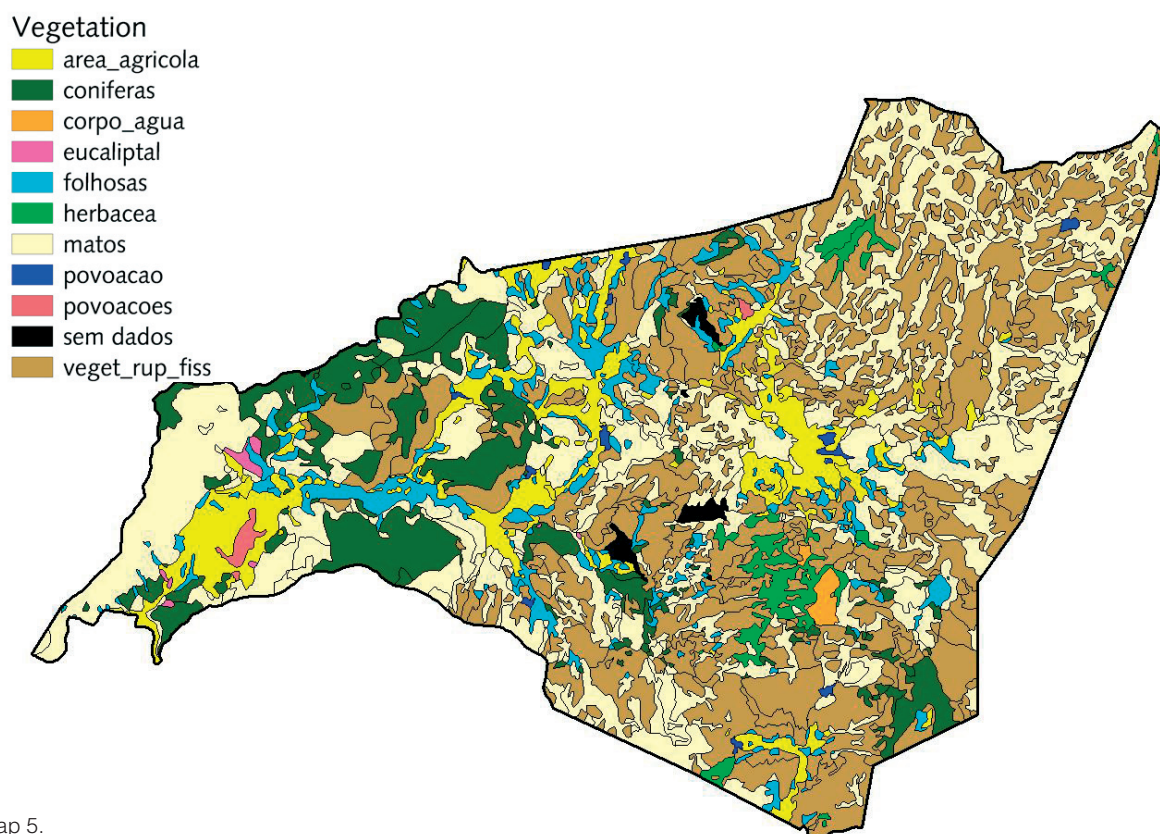
The natural landscape in the Park, occupying Mt. Alvão's western slope, was influenced by its geological origins and the climate. From a geological perspective, the Park can be divided into two regions: the upper zone, consisting of Lamas de Olo and Arnal, where a profusion of large granite formations forms a harsh and angular landscape, while the lower zone, with its narrow, sheltered valleys (Varzigueto, Fervença, and Ermelo) is characterised by schists and the presence of abrupt changes in altitude. In this area one also encounters the quartzite bands which, due to their hardness, bluntly divide the two regions. In this zone one finds the Fiskas Falls, near Ermelo. Map 4 clarifies the area's geological character and map 5 gives the vegetation of the Park.

Campsite by Arnal.





Map 4.



Map 5.



Agricultural landscape at Arnal.

The mountain ridges of Alvão function as a condensation barrier. They form a transition zone between Atlantic Ocean humidity and dry inland air. This transition affects the weather, most notoriously in Lamas de Olo at an altitude of about 1000 m. Benefiting from the joint effect of the temperate Mediterranean climate and alpine influences in the higher ground, the region's original flora is markedly present, despite the recent increase in grazing areas and pine forestation. The average yearly amount of rain in Vila Real is about 600 mm, while higher up the rain is much more plentiful.

Evenings can be quite cold at camp height, while days are usually hot.

In the stretches of leafy forest a surprising diversity can be found, with species such as White birch, English oak, Black oak, Holly, Bay and Chestnut.

The fauna is also exceptional in the Park, because of its variation and abundance. Amphibians and reptiles are found widely and birds of prey such as Montagu's Harrier, several species of Eagle and Peregrine falcon, favour this location. This nature reserve is also a very important habitat for Bats.

Mammals in the Park range from the smallest Mice, Voles and Shrews to Otter and Fox and even Wolves.

The nine villages in Alvão National Park are surrounded by small fields and pastures. Old trades and crafts are still practiced here. There are traditional linen mills in Ermelo and potteries producing blackware in several places.

Small-scale agriculture is one of the main activities in the area. Since time immemorial, the inhabitants practiced agriculture in the valleys. Twice a day small herds of cows are led to pasture. Goat and sheep flocks spend their days higher up in the mountains.

Locally grown maize is stored in canastros, old granite sheds, sometimes partly built of wood, sometimes all stone. Straw, schists and slates are used as roofing materials. The microclimate inside the canastros, which are built on stone platforms, favours the storage of maize and other local produce. The original design dates back to the 18th Century. Several can be found in most villages.

3 BATS

Not all of the Park was surveyed. Foraging Bats and Bat roosts were studied everywhere except for inaccessible higher zones due to the absence of roads or tracks. Daytime searching for Bats in buildings, water mines, culverts and bridges was done most often along roads and in villages. Occasionally we left the confines of the Park. Map 6 shows kilometre grid cells where bat observations were made. Map 7 show the location of water mines in the area.

Fieldwork concerning Bats had two goals:

- Getting the general picture of species and their numbers in the area;
- Finding Bat roosts.

Methods and materials

In gathering bat data, various methods and materials were used.

1) Use of bat detectors during field excursions

Both heterodyne detectors (in most cases, the Petterson D100) were used, and detectors equipped with time expansion (Petterson D240(x)). Whenever necessary time expansion recordings were made and analysed in programmes such as Batsound or Cooledit. Bat detectors were used both to localise and identify foraging bats, and to find roosts in the early morning hours, manifest by the presence of swarming Bats. Whenever possible roosts were visited again in the evening to count Bats coming out. Table 1 lists the villages where we looked for roosts in this way. Wherever multiple counts were carried through, the highest number of Bats is included.

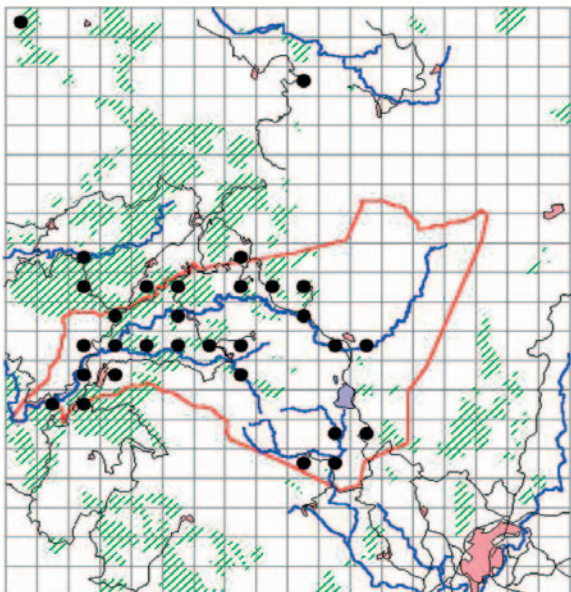
2) Catching Bats in mist nets and catching Bats leaving roosts

Because bat detectors lack the range to identify all Bat species, mist nets were used in some locations. In most cases nets were used in places many Bats were expected to visit (e.g. watering holes) or closed environments where Bats could hardly evade a mist net (e.g. under bridges). In some locations one or two animals were caught in mist nets or scoop nets for definite identification. Map 8 contains mist net locations.

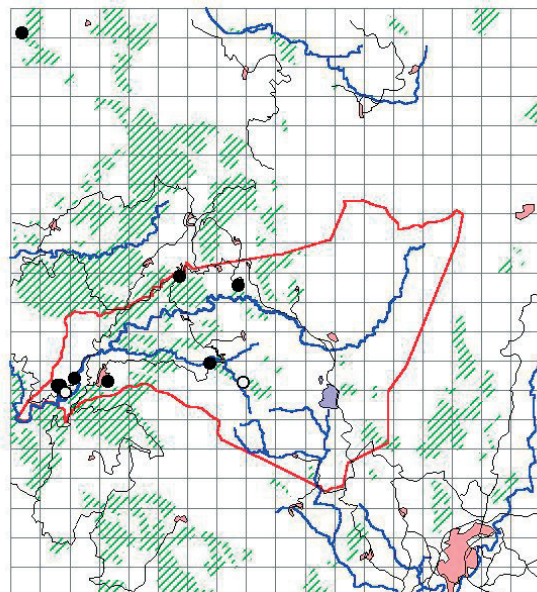
3) Inspection

Inspection of buildings, bridges and underground rooms to establish the presence of Bats. Other objects include empty houses, empty barns, canastros (corn storage buildings), culverts, abandoned tungsten mines, water mines and bridges.

Map 6. Bat observations



Map 7. Water mines



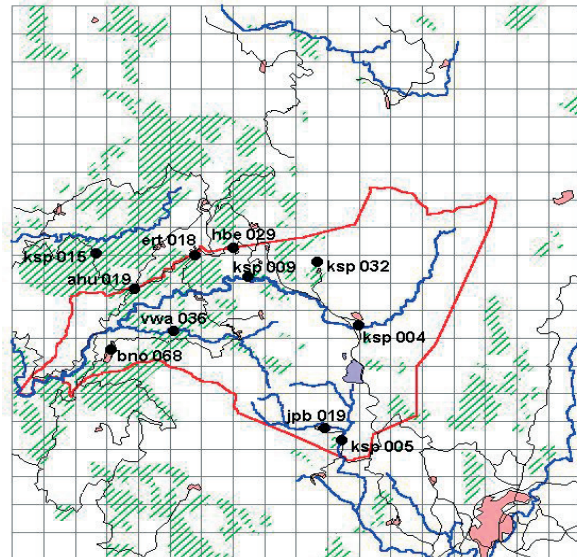
Village/Location	Date	Type roost	Species	Number	WP
Fonte Coberta	31-07-03	House	Chiroptera species	-	Ahu 014
Ermelo	29-07-03	House	Eptesicus serotinus	1	Jvb 030
South of Lamas de Olo	24-07-03	Bridge	Myotis daubentonii	6	Jvb 007
Mestras (west of Vila Chã)	30-07-03	Shed	Myotis emarginatus	1	Ksp 028
Ponta da Lomba	30-08-03	Bridge	Myotis mystacinus	11	jpb 026
West of Lamas de Olo	24-07-03	Bridge	Myotis mystacinus	46	Jvb 009
Ermelo	30-07-03	Canastro	Pipistrellus pipistrellus	>10	Bno 065
Ermelo	30-07-03	Canastro	Pipistrellus pipistrellus	>10	Bno 066
Ermelo	30-07-03	Canastro	Pipistrellus pipistrellus	>25	Bno 068
Varzigueto	30-07-03	Canastro	Pipistrellus pipistrellus	53	Bno 013
Pioledo	29-07-03	House	Pipistrellus pipistrellus	>39	Hbe 029
Pioledo	29-07-03	Canastro	Pipistrellus pipistrellus	10	Hbe 030
Pioledo	29-07-03	Canastro	Pipistrellus pipistrellus	23	Hbe 031
Lamas de Olo	01-08-03	House	Pipistrellus pipistrellus	58	Hbe 036
Lamas de Olo	01-08-03	School	Pipistrellus pipistrellus	5	Hbe 037
Lamas de Olo	01-08-03	House	Pipistrellus pipistrellus	9	Hbe 038
Lamas de Olo	01-08-03	House	Pipistrellus pipistrellus	5	Hbe 039
Ermelo	28-07-03	House	Pipistrellus pipistrellus	3	Jvb 027
Ermelo	29-07-03	House	Pipistrellus pipistrellus	5	Jvb 028
Ermelo	28-07-03	House	Pipistrellus pipistrellus	64	Jvb 029
Fervenca	30-07-03	Canastro	Pipistrellus pipistrellus	8	Ksp 025
SW of Ermelo	28-07-03	Canastro	Pipistrellus pipistrellus	> 5	Bno 039
Alto da Costa das Boucas	27-07-03	Culvert	Plecotus auritus	1	Bno 025
Limões area	30-07-03	Bridge	Plecotus auritus	1	Hbe 025
Dornelas	01-08-93	House	Plecotus auritus	5	Ksp 031
Dornelas	01-08-03	Shed	Plecotus auritus	>20	Ksp 032
Fervenca	30-07-03	Garage	Plecotus austriacus	20	Bno 049
Arnal	28-07-03	Shed	Plecotus austriacus	>20	Jpb 019
Fervenca	30-07-03	little shed	Plecotus austriacus	>6	Ksp 023
Near Fontelas	30-07-03	Water mine	Rhinolophus ferrumequinum	1	Hbe 028
S. João	29-07-03	Chapel	Rhinolophus ferrumequinum	1	Vwa 036
Road at Ermelo	26-07-03	Culvert	Rhinolophus hipposideros	1	Bno 036
Ermelo	29-07-03	Canastro	Rhinolophus hipposideros	10	Jvb 026
Ermelo	30-07-03	Canastro	Rhinolophus hipposideros	>4	Ksp 029
S. João	29-07-03	Kapel/Chapel	Rhinolophus hipposideros	2	Vwa 036
SW of Ermelo	28-07-03	Canastro	Rhinopholus hipposideros	1	Bno 039
Mestras (west of Vila Chã)	30-07-03	Shed	Rhinopholus hipposideros	2	Ksp 028
Arnal (Alto dos Cabeços)	31-07-03	Crevice	Tadarida teniotis	>200	Jpb 016

Table 1, Overview of roosts

4) Use of film

To determine species, to study behaviour and for educational purposes bats were filmed in several locations. Digital video-cams and infra-red lamps were used.

Approximately 982 Bats were recorded during 182 observations in 30 kilometre grid cells. At least 15 species were observed. An overview of them is given in Appendix B. Maps in the back show observations per species. On these maps roost locations are shown by a triangle on the exact co-ordinate intersection. Detector observations were too numerous to be indicated exactly. A dot in a kilometre grid cell indicates sightings, mist net catches or detector observations. Daytime forays and early morning searches for Bats returning to their roosts yielded a total of 38 roosts. A description of these roosts is included in the species discussions. In 11 locations Bats were caught in mist nets or scoop nets. A total of 45 Bats was caught. Most were caught over a water



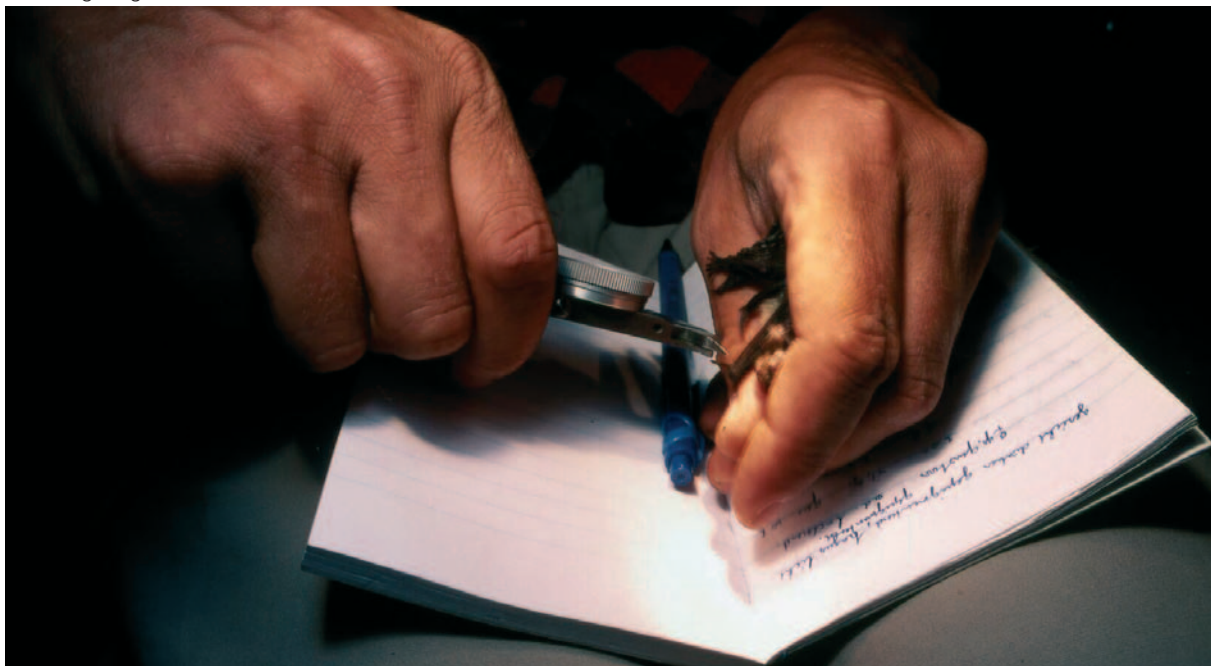
Map 8. mist net locations

38 roosts. A description of these roosts is included in the species discussions. In 11 locations Bats were caught in mist nets or scoop nets. A total of 45 Bats was caught. Most were caught over a water

Village/Location	Date	Type of roost	Species	N
Near Fontelas	30-07-03	Watermine	Rhinolophus ferrumequinum	1
S. João	29-07-03	Chapel	Rhinolophus ferrumequinum	1
Ermelo	29-07-03	Canastro	Rhinolophus hipposideros	10
Ermelo	30-07-03	Canastro	Rhinolophus hipposideros	>4
Road at Ermelo	26-07-03	Culvert	Rhinolophus hipposideros	1
SW of Ermelo	28-07-03	Canastro	Rhinopholus hipposideros	1
S. João	29-07-03	Chapel	Rhinolophus hipposideros	2
Mestras (west of Vila Chã)	30-07-03	Shed	Rhinopholus hipposideros	2

Table 3, Roosts of Rhinolophus-species

Mesuring a right arm of a Plecotus austriacus.



Species	Date	Sex	Age	Location
<i>Rhinolophus ferrumequinum</i>	29-07-03	m		St Joao Chapel
<i>Rhinolophus hipposideros</i>	29-07-03	m		St Joao Chapel
<i>Rhinolophus hipposideros</i>	29-07-03	m		St Joao Chapel
<i>Myotis daubentonii</i>	28-07-03	m		Ermelo area
<i>Myotis daubentonii</i>	29-07-03	m		Acureira
<i>Myotis mystacinus</i>	25-07-03	v	ad	footbridge just before Lamas de Olo
<i>Myotis mystacinus</i>	25-07-03	v	ad	footbridge just before Lamas de Olo
<i>Myotis mystacinus</i>	25-07-03	v	ad	footbridge just before Lamas de Olo
<i>Myotis emarginatus</i>	30-07-03	v		
<i>Myotis nattereri</i>	31-07-03	m		water supply point SE of Fojo, in woods
<i>Eptesicus serotinus</i>	31-07-03	m		water supply point SE of Fojo, in woods
<i>Eptesicus serotinus</i>	31-07-03	m		water supply point SE of Fojo, in woods
<i>Eptesicus serotinus</i>	31-07-03	v	ad	water supply point SE of Fojo, in woods
<i>Eptesicus serotinus</i>	31-07-03	v		water supply point SE of Fojo, in woods
<i>Eptesicus serotinus</i>	31-07-03	v		water supply point SE of Fojo, in woods
<i>Eptesicus serotinus</i>	31-07-03	v	ad	water supply point SE of Fojo, in woods
<i>Eptesicus serotinus</i>	31-07-03	v	ad	water supply point SE of Fojo, in woods
<i>Eptesicus serotinus</i>	31-07-03	v		water supply point SE of Fojo, in woods
<i>Eptesicus serotinus</i>	31-07-03	v		water supply point SE of Fojo, in woods
<i>Eptesicus serotinus</i>	31-07-03	v	ad	water supply point W of Villa Cha, in woods
<i>Pipistrellus pipistrellus</i>	29-07-03	v	ad	Pioledo
<i>Pipistrellus pipistrellus</i>	26-07-03	m	ad	rio Arnal bridge (trap location 2)
<i>Pipistrellus pipistrellus</i>	26-07-03	m	juv	rio Arnal bridge (trap location 2)
<i>Pipistrellus kuhli</i>	31-07-03	v	ad	water supply point SE of Fojo, in woods
<i>Pipistrellus kuhli</i>	31-07-03	v	juv	water supply point SE of Fojo, in woods
<i>Pipistrellus kuhli</i>	31-07-03	v	ad	water supply point SE of Fojo, in woods
<i>Pipistrellus kuhli</i>	31-07-03	v	ad	water supply point SE of Fojo, in woods
<i>Pipistrellus kuhli</i>	31-07-03	m		water supply point SE of Fojo, in woods
<i>Pipistrellus (Hypsugo) savii</i>	31-07-03	m		water supply point SE of Fojo, in woods
<i>Plecotus auritus</i>	27-07-03	m	ad	Carvanelle area
<i>Plecotus auritus</i>	01-08-03	v	ad	Dornelas
<i>Plecotus auritus</i>	01-08-03	v	ad	Dornelas
<i>Plecotus austriacus</i>	31-07-03	v		water supply point SE of Fojo, in woods
<i>Plecotus austriacus</i>	31-07-03	v	ad	water supply point SE of Fojo, in woods
<i>Plecotus austriacus</i>	28-07-03	v	ad	shed near lower camp building
<i>Plecotus austriacus</i>	28-07-03	v	ad	shed near lower camp building
<i>Plecotus austriacus</i>	28-07-03	v	ad	shed near lower camp building
<i>Plecotus austriacus</i>	28-07-03	v		shed near lower camp building
<i>Plecotus austriacus</i>	28-07-03	m	ad	shed near lower camp building
<i>Plecotus austriacus</i>	28-07-03	v	ad	shed near lower camp building
<i>Plecotus austriacus</i>	28-07-03	v	ad	shed near lower camp building
<i>Plecotus austriacus</i>	28-07-03	v	ad	shed near lower camp building
<i>Plecotus austriacus</i>	28-07-03	v	ad	shed near lower camp building
<i>Plecotus austriacus</i>	28-07-03	v	ad	shed near lower camp building
<i>Plecotus austriacus</i>	28-07-03	v	ad	shed near lower camp building
<i>Barbastella barbastellus</i>	27-07-03	m		Carvanelle area

Table 2, Morphological data on Bats caught in mist nets or scoop nets

Species	Weight gram	RUA mm	1st finger R mm	Specifics	Waypoint
Rhinolophus ferrumequinum	19,0	55,2			vwa 036
Rhinolophus hipposideros	4,6	38,5			vwa 036
Rhinolophus hipposideros	4,8	39,1			vwa 036
Myotis daubentonii		34,0		snout and arms very dark	bno 068
Myotis daubentonii		37,8		testis clearly visible	ksp 009
Myotis mystacinus		35,5		non- lactating, parasites taken	ksp 004
Myotis mystacinus		34,2		lactating	ksp 004
Myotis mystacinus		34,3		lactating	ksp 004
Myotis emarginatus					ksp 028
Myotis nattereri	7,0	38,9			ahu 019
Eptesicus serotinus				directly released	ahu 019
Eptesicus serotinus				directly released	ahu 019
Eptesicus serotinus				lactating, released, very worn teeth	ahu 019
Eptesicus serotinus				non-lactating, directly released	ahu 019
Eptesicus serotinus				directly released	ahu 019
Eptesicus serotinus	25,5	50,8		lactating	ahu 019
Eptesicus serotinus	30,5	53,7		lactating	ahu 019
Eptesicus serotinus				directly released	ahu 019
Eptesicus serotinus	23,0	52,8			ahu 019
Eptesicus serotinus				formerly lactating	ksp 015
Pipistrellus pipistrellus		29,7		lactating, see 1	hbe 029
Pipistrellus pipistrellus	4,7	30,0			ksp 005
Pipistrellus pipistrellus	3,9	30,4			ksp 005
Pipistrellus kuhli	5,25	34,9		lactating	ahu 019
Pipistrellus kuhli				directly released	ahu 019
Pipistrellus kuhli				lactating	ahu 019
Pipistrellus kuhli	6,5	34,5		lactating	ahu 019
Pipistrellus kuhli	5,6	34,6			ahu 019
Pipistrellus (Hypsugo) savii	8,8	36,5			ahu 019
Plecotus auritus	7,8	35,1	6,2		ert 018
Plecotus auritus			6,8	lactating	ksp 032
Plecotus auritus			5,9	lactating	ksp 032
Plecotus austriacus	9,5	40,9	5,1		ahu 019
Plecotus austriacus			5,7	lactating	ahu 019
Plecotus austriacus	9,5	40,8	6,0	lactating	jpb 019
Plecotus austriacus	9,8	40,8	5,6	lactating	jpb 019
Plecotus austriacus	10,2	41,9	5,9	lactating	jpb 019
Plecotus austriacus	10,9	40,3	6,0	non-lactating	jpb 019
Plecotus austriacus	8	40,2	5,3		jpb 019
Plecotus austriacus	9,4	40,7	5,4	non-lactating	jpb 019
Plecotus austriacus	10,2	40,1	5,3	lactating	jpb 019
Plecotus austriacus	10	41,5	5,6	lactating	jpb 019
Plecotus austriacus	10,5	41,3	5,9	lactating	jpb 019
Plecotus austriacus	9	42,5	5,8	lactating	jpb 019
Barbastella barbastellus	8,5	39,1			ert 018

1. lactating, 3rd finger length 49,6mm; 3rd finger 2nd phalanx (kootje) = 10,2mm / 3rd finger 3rd phalanx = 7,6mm; 5th finger 36,7mm

supply point for fire fighting helicopters southwest of Fojo. Surprisingly, 18 animals were caught. Presumably they used the water supply point to quench their thirst. Measures were taken, necessary for identification, and in most cases their weight was determined. Whenever circumstances did not allow measuring and weighing, Bats were released immediately. Morphological bat data are included in table 2.

Species descriptions

Genus Rhinolophus

In the São João chapel three *Rhinolophus* bats were seen during a daytime observation, but exact identification proved difficult. Therefore these bats were caught at night. They proved to be one male Greater horseshoe (*Rhinolophus ferrumequinum*) and two male specimens Lesser horseshoe (*Rhinolophus hipposideros*). At the mist net location at the water supply point for fire fighting helicopters near Fojo four Greater horseshoe bats were seen who came there to drink. By using video and a detector placed near the basin definite identification proved possible. Far outside the Park one ex. Greater horseshoe was seen. The Greater horseshoe bat's presence in the Park was unknown until now. Although the Lesser horseshoe bat's presence in the Park was not known either, camp records show it is relatively common. In thirteen observations in seven kilometre grid cells thirty animals were counted. Many data concern roosts containing no more than one or two animals. Many observations of foraging Lesser horseshoes were near buildings or inside buildings. Canastros proved to be not just roots, in and around them we often observed foraging Lesser horseshoe bats. Table 3 shows roosts found used by *Rhinolophus*. *Rhinolophus* observations and roosts are shown on the maps in the back of the paper.

Genus Myotis

All Whiskered bat (*Myotis mystacinus*) observations were near Lamas de Olo. The largest colony was found under an old bridge over the Rio Olo near a soccer field west of Lamas de Olo. This bridge was already known as a roost. In crevices between stones 31 adult Whiskered bats were found with 15 young. Under Ponta da Lomba bridge, east of Lamas de Olo, eleven Whiskered bats were counted. Near a bridge between these roosts three Whiskered bats were caught.

Village/Location	Date	Type of roost	Species	N
South of Lamas de Olo	24-07-03	Bridge	<i>Myotis daubentonii</i>	6
Ponta da Lomba	30-08-03	Bridge	<i>Myotis mystacinus</i>	11
West of Lamas de Olo	24-07-03	Bridge	<i>Myotis mystacinus</i>	46
Mestras (west of Vila Chã)	30-07-03	Shed	<i>Myotis emarginatus</i>	1

Table 4, Roosts of *Myotis*-species

Under a bridge south of Lamas de Olo a roost of six Daubenton's bats (*M. daubentonii*) was found. In mist nets used near Ermelo and Acureira two male Daubenton's bats were caught. In the Daubenton's bats caught in the Park, we noticed their snouts were much darker than those of their Dutch counterparts. Near Ermelo, Varzigueto and in the woods west of Vila Chã, using a detector a Daubenton's bat was observed. A single specimen was observed of two other *Myotidae*. A dilapidated barn near Mestras, west of Vila Chã, provided a resting place for a female Geoffroy's bat (*M. emarginatus*). This was the first recording of the species in the Park. At the mist net location at the water supply point for fire fighting helicopters near Fojo a male Natterer's bat (*M. nattereri*) was caught. In a water mine near Ermelo a known Natterer's bat (*M. nattereri*) roost was inspected (Bicho, S.R., 1994), but no animals were found. At trap location 2, near the bridge over the Rio Arnal, a foraging bat was heard that had to be a *Myotis*. A more specific identification was not possible. Table 4 lists *Myotis* roosts found. *Myotis* observations and roosts can be found on maps in the back of the paper.



Genus Nyctalus

Leisler's bat (*Nyctalus leisleri*) is one of the most numerous bats in Alvão Natural Park. In sixteen detector and sight observations of foraging animals approximately 69 specimens were counted in ten kilometre grid cells. High concentrations of foraging Leisler's bats were both heard and seen north of Ermelo (on July 28th at least 25 specimens) and at the water supply point for fire fighting helicopters near Fojo (on July 31st at least 15 specimens) Leisler's bats were also observed near Carvanelle, Varzigueto, Pioledo, Acureira, Dornelas and Lama de Olo.

In spite of many sight and sound observations, no roosts were found, nor were they caught in mist nets. When a European free-tailed bat (*Tadarida teniotis*) roost was counted on July 28th, four bats were seen high overhead. Their flying behaviour and echolocation data suggested *Nyctalus*. Closer identification proved impossible through lack of a time-expansion recording. *Nyctalus* observations are shown on maps in the back of the paper.

Genus Eptesicus

The Serotine bat (*Eptesicus serotinus*) was found mainly in the wooded western and north-western areas of the Park. Most detector observation data stem from the immediate vicinity of Ermelo, Varzigueto, Pioledo and Lamas de Olo. At two water supply points for fire fighting helicopters Serotine bats were caught in mist nets. A single specimen was caught in the woods west of Vila Chã and no less than nine animals were caught on a hillside southeast of Fojo. Among the animals caught were some lactating females, which indicates the presence of Serotine maternity roosts. An observation of bats swarming in the early morning near a house in Ermelo led to an evening attic visit. Only one Serotine bat was found. Although the inhabitants of the house had never noticed bats in the attic, the amount of droppings suggested the regular presence of a bat group. Details of the roost found are in table 5. Serotine bat observations are on a map in the back of the paper.

Village/Location	Date	Type of roost	Species	N
Ermelo	29-07-03	House	<i>Eptesicus serotinus</i>	1

Table 5, Roost of *Eptesicus serotinus*

Village/Location	Date	Type of roost	Species	N
Ermelo	28-07-03	House	Pipistrellus pipistrellus	3
Ermelo	28-07-03	House	Pipistrellus pipistrellus	64
Ermelo	29-07-03	House	Pipistrellus pipistrellus	5
Ermelo	30-07-03	Canastro	Pipistrellus pipistrellus	>10
Ermelo	30-07-03	Canastro	Pipistrellus pipistrellus	>10
Ermelo	30-07-03	Canastro	Pipistrellus pipistrellus	>25
SW of Ermelo	28-07-03	Canastro	Pipistrellus pipistrellus	> 5
Fervenca	30-07-03	Canastro	Pipistrellus pipistrellus	8
Lamas De Olo	1-08-03	House	Pipistrellus pipistrellus	58
Lamas De Olo	1-08-03	School	Pipistrellus pipistrellus	5
Lamas De Olo	1-08-03	House	Pipistrellus pipistrellus	9
Lamas De Olo	1-08-03	House	Pipistrellus pipistrellus	5
Pioledo	29-07-03	House	Pipistrellus pipistrellus	>39
Pioledo	29-07-03	Canastro	Pipistrellus pipistrellus	10
Pioledo	29-07-03	Canastro	Pipistrellus pipistrellus	23
Varzigueto	30-07-03	Canastro	Pipistrellus pipistrellus	53

Table 6, Roosts of *Pipistrellus pipistrellus*

Genera Pipistrellus (Hypsugo)

With a total of 420 animals observed in 21 kilometre grid cells, the Common pipistrelle (*Pipistrellus pipistrellus*) was the most frequently observed bat and probably also the most numerous one in Alvão Natural Park. Almost everywhere the Pipistrelle was heard on the detector. At the mist net location near Arnal two specimens were caught.

Early morning searches for swarming animals to find roosts proved to be a good method for finding Common pipistrelles. No less than sixteen roosts were found. Table 6 lists Common pipistrelle roosts. In a *Pipistrellus* roost in Pioledo detector observations pointed to the presence of *Pipistrellus pygmaeus*. More than once a peak frequency over 50 kHz was heard. To obtain a more definite identification, during a count of Serotines leaving the roost we tried to catch animals and sound recordings were made. Due to multiple roost exits only one specimen was caught. After measuring the 3rd finger we decided this animal was a Common pipistrelle after all. Sound recordings showed a peak frequency (best quality frequency) of approximately 50-52 kHz, not pointing to *Pipistrellus pygmaeus*.

The map in the back of the paper shows all Common pipistrelle observations.

Kuhl's pipistrelle (*Pipistrellus kuhlii*) was most often observed in the north-western area of the Park. In the woods near Fojo several specimens were observed by detector. Over the water supply point for fire fighting helicopters near Fojo five Kuhl's pipistrelles were caught, among them three lactating females and a juvenile female. This points to the presence of one or more Kuhl's maternity roosts near Fojo. On the same evening at the same site one male Savi's pipistrelle was caught.

Observations of Kuhl's pipistrelles and the Savi's pipistrelle are shown on maps in the back of the paper.

Village/Location	Date	Type of roost	Species	N
Alto da Costa das Boucas	27-07-03	Culvert	<i>Plecotus auritus</i>	1
Limões area	30-07-03	Bridge	<i>Plecotus auritus</i>	1
Dornelas	1-08-93	House	<i>Plecotus auritus</i>	5
Dornelas	1-08-03	Shed	<i>Plecotus auritus</i>	>20
Arnal	28-07-03	Shed	<i>Plecotus austriacus</i>	>20
Fervenca	30-07-03	Garage	<i>Plecotus austriacus</i>	20
Fervenca	30-07-03	little shed	<i>Plecotus austriacus</i>	>6

Table 7, Roosts of *Plecotus*-species



Netting is hard working.

Genus Plecotus

The Grey long-eared bat (*Plecotus austriacus*) is less rare in Portugal than the Brown long-eared bat (*Plecotus auritus*). Both were previously not observed in the Park, but the latter is known from the surroundings of the Park (Barros, personal communication).

Near Carvanelle, on the Alto da Costa das Boucas, a male Brown long-eared bat (*Plecotus auritus*) was caught in a mist net. Most probably it was the same individual seen earlier that day in a culvert. Near Fontelas a Brown long-eared bat was found under a bridge and near Barreiro a foraging individual inside a house. In Dornelas two roosts were found. In a large barn at least twenty Brown long-eared bats were counted; two lactating females were caught for identification purposes. In this roost both adult and juvenile bats were seen. In a garage next to a house at least five Brown long-eared bats were counted. Three Grey long-eared bat roosts were found. In a shed at the beginning of the road to the camping site in Arnal a group of at least twenty animals was found. For identification purposes ten specimens were caught in mist nets, seven of them lactating females. In Fervanca near a garage twenty Grey long-eared bats were counted as they left the roost. Close by was a shed with at least six Grey long-eared bats. Using a mist net near the water supply point at Fojo two female Grey long-eared bats were caught, one specimen was a lactating female. Table 7 lists Brown long-eared bat roosts and Grey long-eared bat roosts. *Plecotus* observations are shown on maps in the back of the paper.

Genus Barbastella

Twice a Barbastelle (*Barbastella barbastellus*) was observed. On the slopes of the Alto da Costa des Boucas near Cavernelhe one specimen was caught in a mist net. Around Ermelo a Barbastelle was heard on a bat detector. Barbastelle observations are on a map in the back of the paper.

Dorp / locatie	datum	Type verblijfplaats	soort	N
Arnal (Alto dos Cabeços)	31-07-03	Crevice	Tadarida teniotis	>200

Table 8, Roost of *Tadarida teniotis*



A canastro with ...



many Lesser horseshoe bats.

Genus Tadarida

After the Common pipistrelle, the European free-tailed bat (*Tadarida teniotis*) was most often observed. In 23 observations in 16 kilometre grid cells about 248 specimens were counted. Many of those were observed near Arnal. On the southern slope of the Alto dos Cabeços was a large maternity roost. The roost was already known, but Park officials would like to know more about their numbers. Counting emerging Bats was a spectacular experience nearly all camp participants enjoyed. Before emerging - almost all day long, really - bats were audible near the crevices without the use of detectors.

Because the bats emerged *en masse* within 5-10 minutes, it was difficult to keep track of their number. Therefore the roost was counted several times. On July 31st at least 200 emerging European free-tailed bats were counted. Using infra-red light and videocams we saw that after this there were still some bats inside. Most of the young specimens were probably old enough to fly along.

In sixteen kilometre grid cells in the rest of the Park foraging European free-tailed bats were observed by the naked ear. The observations are shown on a map in the back of the paper. Table 8 lists the European free-tailed bat roost found.

Chiroptera species

In the old forester's house at the foot of the Fonta Coverta near Anta a large amount of bat droppings were found. The origin remained unclear. The site is marked on a map in the back of the paper.

Discussion and conclusions

As to Bats, the mammal survey in the Alvão Natural Park was very successful. Compared to earlier summer camps more Bat data were collected. The Bat survey database contains no less than 196 separate observations. We owe this success to better survey organisation and better recording and identification methods.

On organisation

Even more than during earlier summer camps, survey focus was on daily Bat excursions and trap checks. Every night several mist net excursions were organised. Daytime searches for bats on church lofts and empty buildings is a standard activity in summer camps. An architectural absence of church lofts was a momentary disappointment, but we found out soon enough that bridges, culverts, water mines and canastros were rich in Bats.

In all activities a lot of attention was paid to sharing knowledge and experience to participants less versed in Bat lore and Bat surveys. The camp may have been the beginning for a new generation of

enthusiastic Portuguese bat researchers. Establishing GPS waypoints at an observation location had a positive effect; observations and waypoints were recorded in conjunction, to the benefit of exactitude. Compared to earlier camps in Italy and Bulgaria relatively little use was made of time-expansion recordings for identification purposes. A few Leisler's bat, European free-tailed bat and Pipistrelle observation recordings were used to reach positive identification.

Results

During the camp fifteen Bat species were observed. In the Park area five species were observed for the first time:

- Greater horseshoe bat (*Rhinolophus ferrumequinum*);
- Lesser horseshoe bat (*Rhinolophus hipposideros*);
- Geoffroy's bat (*Myotis emarginatus*);
- Brown long-eared bat (*Plecotus auritus*);
- Grey long-eared bat (*Plecotus austriacus*).

Greater horseshoe bat and Lesser horseshoe bat had been found earlier in the immediate vicinity of the Park, in Campanho and Asnela (Bicho, S.R., 1994). Both Bats are relatively common in northern Portugal (Mitchell-Jones, A. J. et al., 1999).

Finding Geoffroy's bat and multiple Brown long-eared bat roosts is special in Portugal. More observations of the Grey long-eared bats are known, but only in the northern Portuguese border area (Mitchell-Jones, A. J. et al, 1999).

Although other bats had been found earlier in the Park, some observations were exceptional. Whiskered bat (*Myotis mystacinus*) roosts we found are possibly their only dwelling places in Portugal. Of Savi's pipistrelle (*Pipistrellus (Hypsugo) savii*) and the Barbastelle (*Barbastella barbastellus*) in Portugal, relatively few observations are known (Agreement on the Conservation of Populations of European Bats, 2003).



Grey long-eared bat.

Of other species in the Park, distribution data were significantly extended. For instance, Daubenton's bat (*Myotis daubentonii*) and Leisler's bat (*Nyctalus leisleri*) had only been observed around Lamas de Olo. Some species earlier observed in the Park or its immediate vicinity were missed during the camp. Of Campanho and Vila Nova observations of Lesser mouse-eared bat (*Myotis blythii*) and Schreiber's bat (*Miniopterus schreibersi*) were known (Bicho, S.R., 1994). These locations were not visited and their presence cannot be excluded. A group of Natterers (*Myotis nattereri*) once found in a disused water mine near Ermelo was not found again. The total Natterer count was one.

Next to distribution data, bat roost information is at least as important. As in many European countries, the protection of caves is paramount in protecting bats because so many of them roost there. In the Portuguese Bat Agreement reports, other roosting places get hardly a mention (Agreement on the Conservation of Populations of European Bats, 2003).

In Alvão Natural Park we saw many Bat species using man-made objects, such as houses, barns, sheds, canastros, water mines, culverts and bridges. Per object the amount of Bats may be small, but to Bat populations living in the Park they are important habitats. Protecting these objects is therefore important and in many cases, nature values equal cultural values. Canastros are a fine example. Many canastros in the park are no longer in use and too dilapidated for Bats to use. Other canastros were renovated using modern materials and so became impenetrable by Bats.

Questions for the future

The field study group collected more data about Bats than was yet available in Alvão Natural Park. But of course not all aspects of Bat fauna important for their protection in the Park are now known.

For instance, we do not know where the Leisler's bat -- quite common in the Park -- spends the daylight hours. And how about the status of Bat species encountered only once? Are they indeed rare? Where do they stay during the day? Where are the European free-tailed bat's hunting grounds, do more populations live in the Park? What species did we miss? About Bat hibernation in the Park little is known.

More research is needed to find answers to these questions, more researchers are needed. But Bat research is a labour-intensive business and it may take a long time before results become apparent. Hence the importance of more Bat research balancing efficient data generation and generating enthusiasm in (potential) Bat researchers and Bat lovers.

A few suggestions:

- Detector surveys to map out the most common species' most important foraging areas;
- Detector surveys to find roosts;
- Inspection of mines, water mines, culverts and subterranean spaces during the hibernation period;
- Inspection of buildings and subterranean spaces in the summer period;
- Mist net research;
- Inventory surveys in woods using Bat boxes.

4 LIVE TRAPPINGS OF SMALL MAMMALS

During the field study in Alvão Natural Park live traps were used to catch small mammals. The aim was finding out more about small mammals living in the park and acquiring a general view of species diversity. Speaking on behalf of the Park Authority, José Nascimento specifically asked for more data about different locations around Arnal and the Rio Olo. We concentrated our activities on field borders, brooks and rock formations in and around Arnal river. A main objective of camps like ours is handling and seeing species we as Dutch people haven't seen before. Another objective is broadening our knowledge of trapping techniques and developing new methods. Also, we wanted to show our Portuguese student friends how to work with live traps, where to set them and how to handle caught mice. One or more Portuguese regularly joined us on our rounds.

Materials - live traps and bait

In our field study, we used different types of traps:

- Longworth traps, about 150;
- Pitfalls made of 1,5 litre PET bottles, plastic soft drink bottles with the bottom cut off, about 20, buried upside down;
- Cup traps designed to catch the Pygmy white-toothed shrew (*Suncus etruscus*), about 20;
- Sherman traps, both large and medium sized, respectively 20 and 30. The traps were situated in the immediate vicinity of running water in an attempt to catch the Pyrenean desman (*Galemys pyrenaicus*);
- 5 Citellus traps, also used in an attempt to catch the Pyrenean desman;
- 3 fyke net traps, also used in an attempt to catch the Pyrenean desman;
- 2 wooden mole traps.

Trapping mice by using Sherman live-traps.



Most traps were set up in rows. Some trap locations were chosen to catch specific mammals (Iberian mole, Pyrenean desman, Pygmy white-toothed shrew). Traps were used in seven locations. At most locations several trap rows were set up. Rowed-up traps had consecutive numbers.

The distance between traps was about five meters. Allowances were made for mouse routes and holes.

The need for all traps to be found again by different sets of people, night and day, led to the use of pieces of aluminium foil, easily discernible in lamplight.

The traps were furnished with hay as an isolation agent, indispensable because of the altitude (800 meters). Because of relatively moderate temperatures, during the survey period traps were not reset into the safe position. Wherever possible traps were positioned in the shade.

As bait we used the usual "standard mix", which consisted of peanut butter and oatmeal. Wherever necessary pieces of apple and fish-flavoured cat food pellets were added.

The first series of Longworth traps were prebaited. This means that they were filled with hay and bait and set up in advance, in the safe position, allowing visitors to come and go. Sherman traps, pitfalls and re-placed Longworth traps were not prebaited.

There were three trap rounds a day, at 07:00, 16:00, and 23:00 hours. On all our rounds, we collected data as follows: location, date, round number, time of starting out, trap number (in case of a catch or false alarm), species caught, sex and age, first time catch or re-catch, and any other relevant details.

Trap rows 1, 2 and 3 were set up on July 24th, 2003, and the first inspection round of Longworth traps took place on Saturday night, July 26th about 11:00 hours. Sherman traps and pitfalls in these locations were ready for use. In the days after this, some trap rows were added. The total amount of control rounds was 24.

First catches were marked by cutting away some top hair, using small scissors.

All first catches of a given species were taken back to camp for study purposes. Some participants were not yet familiar with certain typically Portuguese species. Also, we did not want to miss special catches. This method allowed people not yet versed in Mice handling to perfect their technique. All Mice were returned to their proper location within 36 hours.

Trap locations

Alvão Natural Park consists of mountainous areas and hillsides. There are a great many brooks and rills. Many feed larger waterways, Olo river being the widest.

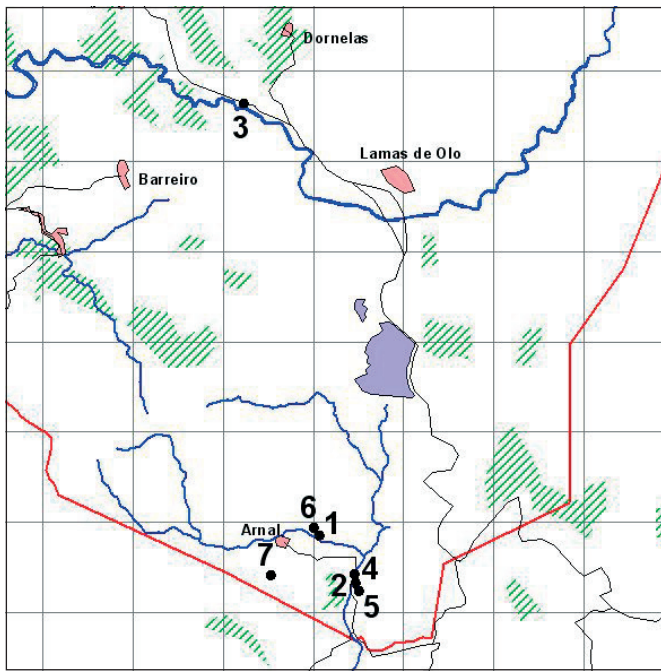
The mountains, taking in the middle position between the humid coast and the drier inland area, reach an altitude of about 1300 meters. The lowest point in the park is at about 260 meters. This allows for a wide ecological diversity. There are coniferous woods, deciduous forests and eucalyptus stands, meadows, fens and riparian fields. In the drier top zone we find a stunted vegetation. An impression of the vegetation of the Park is given on map 3 (Vegetation).

On map 9 trap locations are marked. Table 9 shows when and where traps were put into place and how long they remained in use.

Location 1 - Meadows & riparian areas, Arnal

Location 1 consists of trap rows placed alongside small fields and meadows near the village of Arnal, in the valley of the eponymous river (Ribera do Arnal). Fields are cultivated on natural terraces in the hillside, surrounded by dry stone walls having a maximum height of 1.5 meters. Water from brooks higher up is led towards lower-lying meadows and fields. Day in, day out the water supply is controlled by hand-building small dams or cutting dams again, after agreement has been reached within the village community. Meadowland is used for grazing or hay crops. Fields are mainly used for growing corn.

Drywall structures surrounding terraces and paths en roads, boarded by herbal flora, dominate the



Map 9. Trap locations

Date	24/7	25/7	26/7	27/7	28/7	29/7	30/7	31/7	1/8	2/8	Catch occasions
Locations											
1 A											14
1 B											14
1 C											14
2 A											11
2 B											11
2 C											11
2 D											11
2 E											11
2 F											11
2 G											11
3 A											5
3 B											5
3 C											5
3 D											5
3 E											2
3 F											2
3 G											5
3 H											5
3 I											11
4											5
5											5
6 A											5
6 B											5
6 C											8
7 A											8
7 B											8
7 C											8

Table 9, trap locations - date of placement & use

landscape, along with separate tree stands and shrubs. In the brook's longitudinal direction, drywall structures are connected. Distance between walls varies from five to fifty meters. The brook itself (see locations 2 and 6) is in part enclosed by higher walls (up to three meters), allowing for a rich diversity of structures: water, rocks, riparian vegetation, shrubs and trees.

1-A Longworth traps

Thursday July 24th, fourteen Longworth traps were set out in a row alongside a low wall, bordering a meadow.

From July 26th until July 31st, traps were checked three times per 24 hours (5 inspection nights). Equidistance was 4-5 meters, aluminium foil was used to mark trap locations, traps were filled with hay and standard bait mix.

At the foot of each wall was an irrigation gully, regularly in use. At both ends of the row was a small Oak (*Quercus pyrenaicus*). Alongside the wall was herbal vegetation - Broom (*Cytisus scoparius*), Bramble (*Rubus fruticosus* sp.), 20%, Bracken (*Pteridium aquilinum*), 40%, grasses (*Holcus lanatus*, among others) and *Crepis capillaris*.

1-B Longworth traps

Thursday July 24th, twenty Longworth traps were set out in a row alongside a stony path through fields, at the foot of one of the low walls surrounding the area.

From July 26th until July 31st, traps were checked three times per 24 hours (5 inspection nights). Equidistance was 4-5 meters, aluminium foil was used to mark trap locations, traps were filled with hay and standard bait mix.

Alongside the traps were some young Oak (*Quercus pyrenaicus*), 3-4 meters, 10%. A narrow strip (<50 centimetres) of herbal flora contained shrubs and grasses such as Bracken (*Pteridium aquilinum*), 30%, Bramble (*Rubus fruticosus* sp.), 30%, Soft rush (*Juncus effusus*), Bedstraw (*Galium verum*), Perforate St. John's wort (*Hypericum perforatum* sp.), Gorse (*Ulex europaeus*). In the summer, the path itself is in regular use for irrigation purposes.

1-C Longworth traps

Thursday July 24th, sixteen Longworth traps were set out alongside a low wall bordering a meadow near the brook (Ribera do Arnal).

From July 26th until July 31st, traps were checked three times per 24 hours. Equidistance was 4-5 meters, aluminium foil was used to mark trap locations, traps were filled with hay and standard bait mix. Here and there rocks with grass intersected the wall between two mowed meadows. The immediate vicinity lacked trees and shrubs, apart from Bramble (*Rubus fruticosus*), 10%. The traps were set out in a grassy (85%) and herbal vegetation consisting of Thistle (*Carduus crispus* sp.), Foxglove (*Digitalis purpurea*) and a single young Oak (*Quercus pyrenaicus*), Sheepsbit (*Jasione montana*), Lady's bedstraw (*Galium verum*) and Bracken (*Pteridium aquilinum*).

Location 2, Ribero do Arnal

In this location, traps were set out in the immediate vicinity of the brook (Ribera do Arnal). In this area, the brook meanders through a varied landscape consisting of hay meadows, fields and gardens and untrimmed shrubs. In and around the brook rocks form a rich structure. In this location, the brook is partly bordered by dense shrubs and an undergrowth consisting of grasses and herbs.

The rows were set out in a variety of settings, found closely together.

2-A Longworth traps near brook

Thursday July 24th, ten Longworth traps were set out in rows near the brook, some alongside a wall, some on both sides of the brook.

Saturday July 26th the rounds started. Wednesday July 30th the traps were collected again, after four

nights. Equidistance was 4-5 meters, traps were marked with aluminium foil and filled with hay and standard bait mix.

There were no trees here to provide cover. Varied shrubs, covering >40% here, included Alder (*Alnus glutinosus*) and Willow (*Salix atrocinerea*). Herbal vegetation on the stony ground included Bracken (*Pteridium aquilinum*), *Galium botherianum*, *Luzula* sp., *Viola canina*, *Carex* sp.

2-B Longworth traps in tree stand

In this location ten Longworth traps were set out and checked in the way described above. Equidistance 4-5 meters, marked with aluminium foil, filled with hay and standard bait mix.

The traps were set out in a row between trees and a dense, sparsely varied undergrowth. The trees were Chestnut (*Castanea sativa*), Oak (*Quercus pyrenaicus*) and *Frangula alnus*. In the undergrowth we found Heather (*Erica arborea*) and *Ulex* sp. Herbs were mainly Bracken (*Pteridium aquilinum*).

2-C Longworth traps in tree stand/untended field

In this location ten Longworth traps were set out and checked as described above. The traps were set out in a row in a semi-open tree stand with a dense undergrowth. Equidistance was 4-5 meters, traps were marked with aluminium foil and filled with hay and standard bait mix.

Trees were mainly Oak (*Quercus pyrenaicus*) and Chestnut (*Castanea sativa*). The undergrowth was mainly Broom (*Sarothamnus scoparius*), *Ulex* sp., *Cistus spillosepala* and *Rubus*. Among the herbs were Viper's bugloss (*Echium plantagineum*), *Malva neglecta*, *Erica cinerea* and Royal fern (*Osmunda regalis*).

2-D Longworth traps hayland

In the same period, ten Longworth traps were set out and checked in a soggy meadowland area under a steep ridge bordering a corn field above. Trap equidistance was 4-5 meters, traps were marked with aluminium foil and filled with hay and standard bait mix. Vegetation was present in the form of shrubs, including Bramble (*Rubus fruticosus*) and Bracken (*Pteridium aquilinum*). Herbs growing here were Catchweed (*Galium botherianum*), Thistle (*Carduus crispus* sp.), Perforate St. John's wort (*Hypericum perforatum*), Foxglove (*Digitalis purpurea*) and *Erica cinerea*.

2-E Longworth traps near brook

In a zigzag row, ten Longworth traps were set out on the stony bank of the Ribera do Arnal, covered by high trees and bushes. Equidistance 4-5 meters, traps were marked with aluminium foil and filled with hay and standard bait mix.

Trees were Birch (*Betula alba*), Alder (*Alnus glucosa*) and Rowanberry (*Frangula alnus*). Herbs were sedges, *Viola canina* and Royal fern (*Osmunda regalis*).

2-F Sherman traps near brook

On the rocks in and around the Ribera do Arnal brook bank, fifteen small and ten large Sherman traps were set out. Equidistance varied, cat food was used as bait.

These traps were placed on July 24th, readied immediately and collected again on Monday July 28th (4 inspection nights).

These traps were intended to catch Miller's water shrews (*Neomys anomalus*) and Pyrenean desman (*Galemys pyrenaicus*).

For a landscape description, see Longworth traps in 2-E.

Location 3 -- Rio Olo

Here traps were set out in rows right next to the brook or in the immediate vicinity. The clear stream varies in width, 5-10 meters. Rocks rounded by erosion allow for a rich structure. Growth is variable as well: from sparse vegetation on rocks to grassy areas, shrubs providing cover and tree rows and



Placing mole traps

stands. All these structures varied within a distance of 25-100 meters.

The brook has high water periods, manifest through material deposits on the banks. Goats and cows graze nearby. Higher up, in more sparsely overgrown stony areas, Mice holes could be found; on the banks these were absent. In the meadows, traces of digging by Moles and Mice were visible.

Trees were Oak (*Quercus* sp.), Pine (*Pinus* sp.) and Birch (*Betula alba*). Birches were mostly solitary near water, pine in small stands (diameter 30-50 meters), Oaks often in rows separating (former) tilled fields. Shrubs are Heather (*Calluna* sp.), reaching up to two meters, Broom (*Cytisus scoparius*), Gorse (*Ulex europea*), Oak, Bramble (*Rubus* sp.). Many stunted shrubs, especially *Calluna*, count as herbal flora here. Here and there tree stands are surrounded by Royal fern (*Osmunda regalis*) reaching a height of one meter.

Shrubs are relatively dense, consisting of Heather and Broom in stands 2-25 meters in diameter. Undergrowth is sparse, with much dry material and leaf mould. At the edges there are transition zones toward grassy terrain, rich in herbs.

Herbal flora is locally concentrated - grasses, sedges, herbs and stunted shrubs (*Calluna* sp., *Erica* sp., *Ulex europea*). Also Wood sage (*Teucrium scorodonia*), Bird's foot (*Lotus* sp.), Violet (*Viola* sp.), Thistle (*Carduus* sp.).

On stony ground, stunted vegetation often appears in the form of grass tussocks, rushes and moss (Peat moss, *Sphagnum*, in wet areas, mainly *Polytrichum commune* elsewhere). Mosses are found on and near banks.

The soil is variable, consisting of stone, shingle and sandy material. Humus covers the ground in places.

3-A Longworth traps in thicket, near wall, near brook

On Thursday, July 24th, fifty Longworth traps were set out alongside the Rio Olo. Equidistance was 5 meters, traps were marked with aluminium foil. Traps were filled with hay and the standard bait mix. Traps were placed under shrubs or stones. As often as possible, the tunnel part rested on humus. At the outset, traps were in the safe position, until July 26th. Until July 28th traps were checked three times per 24 hours (2 inspection nights).

The traps row paralleled a row of shrubs (Heather, Broom) and part of a dry stone wall. Two or three traps were placed on rocky open ground. About half of the row bordered on the rich brook bank vegetation with tussocks and shrubs almost bordering on the water. There was no direct cover from trees. Here and there trees were at a distance of 10-50 meters. At about two-thirds of its length, the trap row crossed the brook.

3-BC & FGH Sherman traps and pitfalls on brook bank

Alongside the Rio Olo and on rocks in the brook larger traps were set out twice. These traps were aimed at catching Pyrenean desman (*Galemys pyrenaicus*).

The remaining five pitfalls were used in places chosen to catch the Iberian mole (*Talpa occidentalis*). The pitfalls were put in shallow holes dug to ensure the rim of each pitfall was flush with the bottom of a mole tunnel between two molehills, in the hope the animal would be caught on the way. The holes were about 25 centimeters deep and covered with a lid.

Pitfalls were checked twice per 24 hours. The first row D was taken away on July 26th and replaced on July 27th. This row was taken away on July 31st.

In the same meadow wooden mole traps were used.

3-E Wooden mole traps

Two wooden mole traps were placed in holes dug in horizontal mole tunnels and checked on July 24th and 25th.

The mechanism proved tricky: the least deviation from the horizontal caused faulty (incorrect) closing. Traps also functioned badly because of moisture.

In a dense turf grasses and herbs reached a height of 20-50 centimetres. The soil was covered with a firm humus layer with old Root (*Daucus carota*) remnants. Dry stone walls, shrubs and a few trees bordered the meadow. Some of the top soil was fine and crumbly (eroded granite), the ground was rich in humus (moist) and not very stony. No soil life such as worms were found when digging the holes.

Locations 4 and 5 Roadsides and borders Arnal

During two inspection nights two rows of ten pitfalls were in place alongside roads and small tilled fields near Arnal. These locations were called Locations 4 and 5. These rows were aimed at catching Pygmy white-toothed shrew. No animals were found in these traps.

Location 4 (traps 1-20) was a very narrow strip next to a dry stone wall (many lichens) with a height of 1.2 meters. Behind the wall were vines and a small cornfield. As traps plastic coffee cups were used, placed between the stones. Because this location borders on the Arnal-Vila Real thoroughfare, the traps looked like litter. In this narrow strip grew Sheepsbit (*Jasione montana*), Knapweed (*Centaurea jacea*), Plantain (*Plantago lanceolata*), Cocksfoot (*Dactylis glomerata*), Toadflax (*Linaria vulgaris*), Reseda (*Reseda lutea*), Digitalis (*Digitalis purpurea*), Slender St. John's wort (*Hypericum pulchrum*), and Gorse (*Ulex minor*). Bramble (*Rubus* species) was predominant here.

Location 5 (Traps 11-20) was alongside a footpath following the brook Ribero do Arnal. On the right-hand side between the brook and the path lie cornfields and vegetable gardens. On both sides of the path there were waist-high dry stone walls. On the left-hand side the top of the wall formed a terrace border including the following plants -- *Cistus psilosepalus* and *Catananche caerulea*, both absent in the Netherlands, *Teucrium chanadrys*, *Sedum*, *Jasione montana*, *Viola canina*, *Blechnum spicant*, *Digitalis purpurea*, *Reseda lutea*.

There were scant trees - Oak (*Quercus pyrenaica*), Alder buckthorn (*Rhamnus catharticus*) and Broom (*Genista hystrix*).



Fyke in Arnal river

Location 6 Ribera do Arnal

At location 6 the traps were placed directly in the brook. The aim was to catch the Pyrenean desman. At this location the brook flows through a varied landscape with hay meadows and garden (see description of location 1). Mossy, rocky hillsides dotted with trees start 15-50 meters away. On both sides of the brook are stone walls, 2-3 meters high; brook width within these walls is about ten meters. In and around the brook, rocks form a rich structure with a dense vegetation consisting of sedge (*Carex* sp.) and rushes (*Juncus*). Trees and scrub have sprouted up on the walls and in the immediate vicinity of the water, such as *Quercus pyrenaica*, *Betula alba*, *Alnus glutinosa*. The brook offers a varied structure; open stony stretches, where the water flows speedily, densely overgrown stretches where the whole of the brook is covered by vegetation, and quiet pools measuring 3-15 meters. In some places the walls are lower, the stream widens and is flanked on one or both banks by willows (*Salix*).

6-A Sherman traps

At an equidistance of 2-5 meters, five groups of ten Sherman traps (forty medium, ten large sized traps) were set out in the stream bed. Distance between groups of traps was 30-50 meters. Traps were checked from July 29th until July 31st (2 inspection nights). Cat food (fish and shrimp flavour) was used as bait, affixed to a leaf of grass. The traps were set out in a special way to allow inspection from the bank with the aid of a lamp and binoculars.

6-B Fyke traps

Wednesday July 30th, three fyke traps were placed. These were inspected during three nights and removed on August 2nd. The fyke traps consisted of synthetic netting (mesh width 1-1,5 centimetres). Maximum fyke width was about six meters. A guy rope and floaters kept the fyke in its place and lead weights rested on the brook bed. The fyke was as wide as the Ribera do Arnal itself, ensuring a complete closing-off. Towards the end of the netting rings of diminishing width led to an inner funnel and a narrow opening (4 centimetres) with a ragged end. The fyke opening was directed downstream, the end of the funnel rested on stones above the water surface. The fyke could be closed off (put into in the 'safe' position). This was done after morning inspections. Towards the end of the afternoon, the

fykes were opened again.

The fykes were set out in deeper parts of the brook, in the pools.

Location 7 Campsite Arnal

Around the campsite building, on a hillside near Arnal village, three rows of Longworth traps were set out. Placed on Tuesday July 29th these traps were inspected until Friday August 1st (3 inspection nights). Equidistance was five meters and trap locations were marked with aluminium foil. Traps were filled with hay and standard bait mix.

This location is stony and rocky hillsides with a lot of tiny relief and a rich vegetation structure, consisting of shrubs and herbs. Trees are absent here.

The hillsides are heavily grazed by sheep and goats and the odd cow, resulting in bare patches without a humus layer. In these open areas we found many mice holes.

7-A Longworth traps toward Vila Real

Traps were set out in heavily grazed terrain on a hillside facing Vila Real (SE). Traps were set out mainly under shrub (*Ulex* sp. among others). Where rocks and shrubs were closely together, there was something of a herbal layer. *Erica cinerea* was the main ground covering plant.

7-B Longworth traps

This row of traps was set out in relatively heavily grazed terrain on a steep hillside (S-SE) over the campsite building. Most traps were under rocky overhangs and under shrubs. Some shielded areas were overgrown with herbs, mainly grass.

7-C Longworth traps

This row was on the hillside facing Arnal (NW). There was more growth here, mainly herbs and stunted shrubs. *Erica cinerea* and Royal fern (*Osmunda regalis*) were predominant. The stony ground was variable here and the herbal layer (mainly grass) was denser than elsewhere.

Front of the fyke.



Species Location	Sg	Na	Cr	Gp	Ml	Msp	As	Md	Ms	Eq	Mammals	
											Total	False
1 A			3				38	3	21		65	2
1 B		1	30				37		2		70	2
1 C			11				4				15	2
2 A		1					18		1		20	8
2 B					3	1	22				26	3
2 C			7				16	1	1		25	1
2 D	1		7				25				33	3
2 E		5					26				31	7
2 F		5					4				9	1
2 G		1					4				5	1
3 A							18				18	2
3 B		1									1	
3 C												
3 D												
3 E												
3 F												
3 G												
3 H												
3 I					1						1	
4												
5												
6 A							2				2	
6 B												
6 C				1							1	5
7 A							17				17	
7 B			1				4			1	6	
7 C			5								5	
Total	1	14	64	1	4	1	235	4	25	1	350	37
%	0,3	4	18,3	0,3	1,1	0,3	67,1	1,1	7,1	0,3		

Table 10, Mammals caught and re-caught in live traps

Results

An overview of the species caught is given in Appendix C. This appendix contains English, scientific, Dutch and Portuguese names of species caught, as well as the grand total result.

Table 10 shows the results concerning mammals, by species and location. At least nine different species of small animals were caught.

In all 350 mice were caught, an occupancy rate of 12,4%. Of 350 animals 152 were newly caught and 198 caught again. In six cases it is unknown whether a mouse was newly caught or caught again. One reason for this mishap was escape during inspection. Sometimes this was not mentioned in the report. Afternoon inspections provided few results.

During the inspection period seventeen fatalities were found. Dead animals were taken back to the campsite and measured. Results are in Chapter 5.

Apart from mice, catches included slugs, lizards and a frog. In 37 cases there was a false alarm (no catch, trap found closed). During the inspection period two Longworth traps were sabotaged. During this period twelve pitfalls in location 3 were found next to their pit.

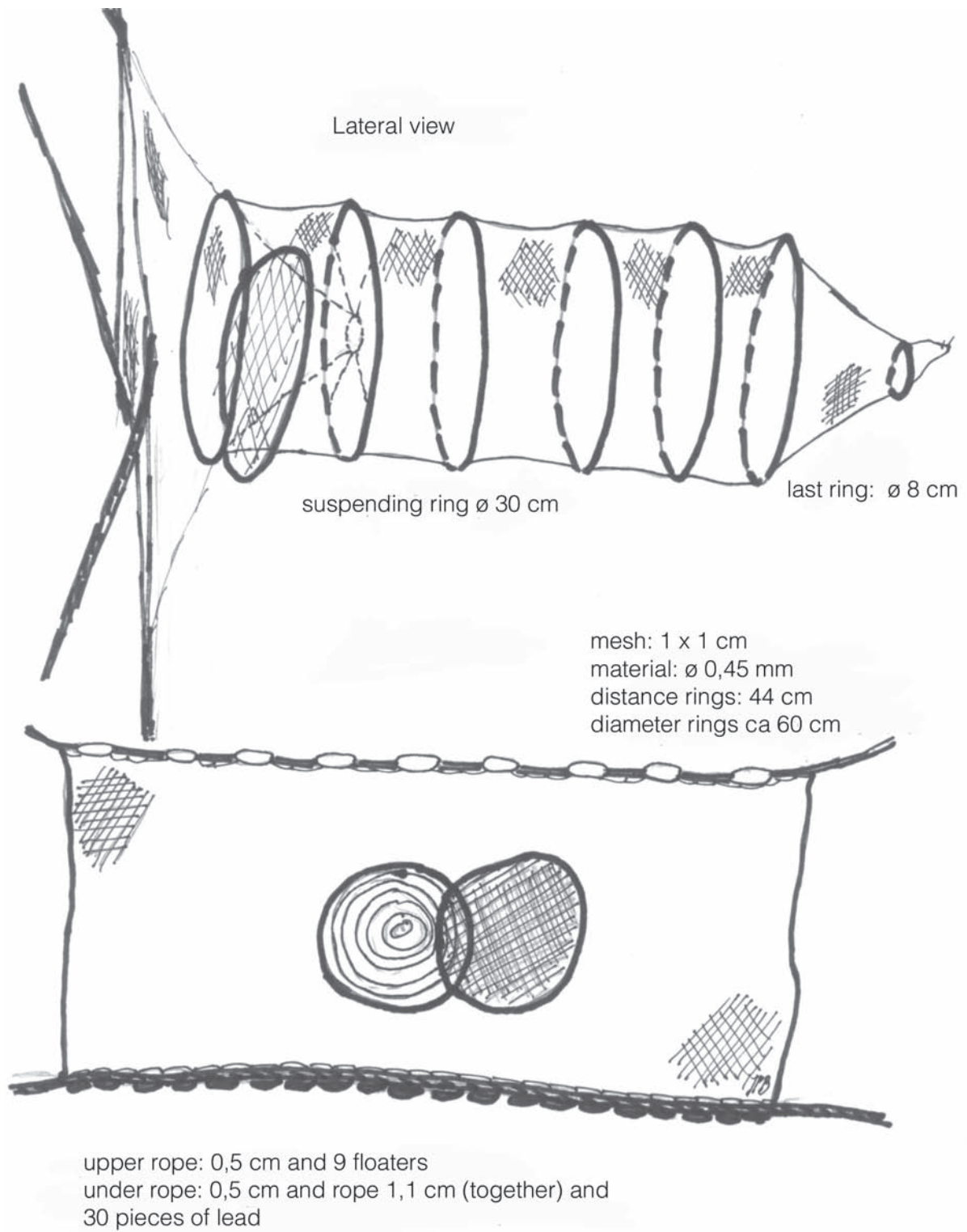


Figure 1. A drawing of the fyke

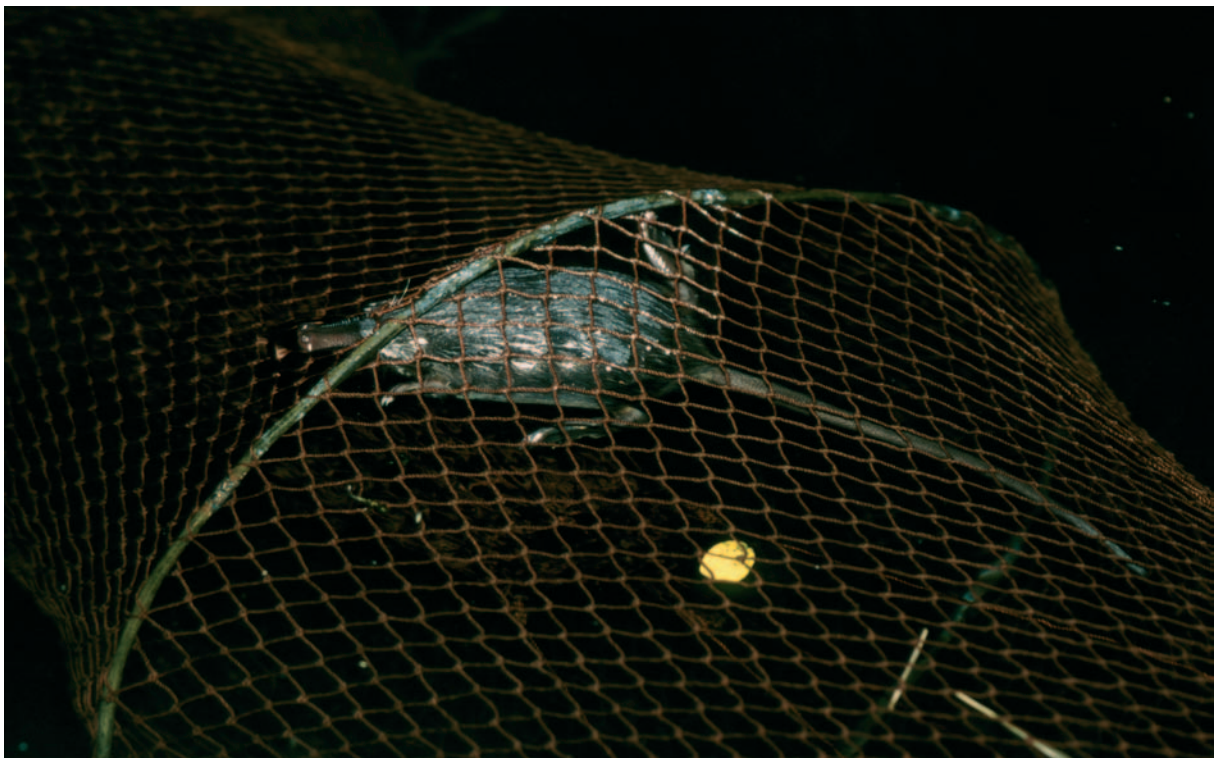
A maximum species diversity was found in locations 1 and 2. Six and seven species respectively, were caught here. In some cases, traps here were prebaited and here the inspection period was the longest. Some locations yielded poor results, some none. In some cases the inspection period was very short. The use of pitfalls was not very successful. In spite of our efforts, we did not catch the Pygmy white-toothed shrew.

We knew from experience it is next to impossible to catch the Pyrenean desman. During this camp we did not succeed with Sherman traps, both large and medium, or Citellus traps. Only a fyke yielded the result we hoped for. A drawing of the fyke is given at figure 1.

The most frequent catch was the Wood mouse (*Apodemus sylvaticus*), 67,1% of all animal catches. Both *Crocidura* species were hard to classify in living animals. Measures were not decisive. During the camp we did not determine between Greater white-toothed shrew (*Crocidura russula*) and Lesser white-toothed shrew (*Crocidura suaveolens*). Attempts were made to determine the right subspecies. Owl pellet data and dead animals pointed invariably to Greater white-teethed shrew. Therefore we should conclude nine species were caught during the camp. All candidates therefore, even the ones called Lesser white-toothed shrews during the camp, are listed in this report as Greater white-toothed shrews.

Row 7, near the campsite building, yielded a Garden dormouse. Inside the campsite building a Garden dormouse (*Eliomys quercinus*) was even caught by hand.

Material keeper Menno Haakma had sprayed all the new Longworth traps green. Many traps closed too easily. Some doors needed fiddling before functioning well. Many doors would close as soon as the traps were set down. Often this would be noticed, but this was probably the main cause of closed but empty traps.



Got him!

5 OWL PELLETS AND DEAD MAMMALS

During daytime excursions around Vila Real old buildings were inspected. In church attics our main interest was finding Barn owl pellets; however, we did not find any. Towards the end of the camp period, José Nascimento gathered two collections, in the Constantim and Boque area respectively. These locations are shown on map 10. It is next to impossible to organise a small mammal survey without mammal fatalities. However, dead animals allow a sharper analysis. Results are in a summing up at the end of this chapter.

Material and methods

Owl pellets were collected in Boque and Constantim. Joost Verbeek, Kees Mostert and Jan Piet Bekker took the pellets home for analysis using a binocular microscope. Small mammals found dead in traps were measured in millimetres and their weight was taken down in grams.

In identifying species found in pellets Lange's tables were used (Lange e.a., 1986). Identifying Crociduridae is hard; the difference between *C. russula* and *C. suaveolens* should be determined by studying P4, the last unicuspid in the upper jaw (fig. 2). Area maps point to Moles found in pellets being *Talpa occidentalis*. Upper jaw parts found in the pellets put proof to this by the presence of bicuspid in the molars (fig. 3). New to us was the presence in pellets of the Lusitanian pine vole (*Microtus lusitanicus*). Therefore a short survey of its skull characteristics are included here, along with those of other voles in Spain and Portugal. Voles in the Iberian peninsula can be divided into two groups: the *Microtus* group in a narrower sense

Map 10. Locations of owl pellets

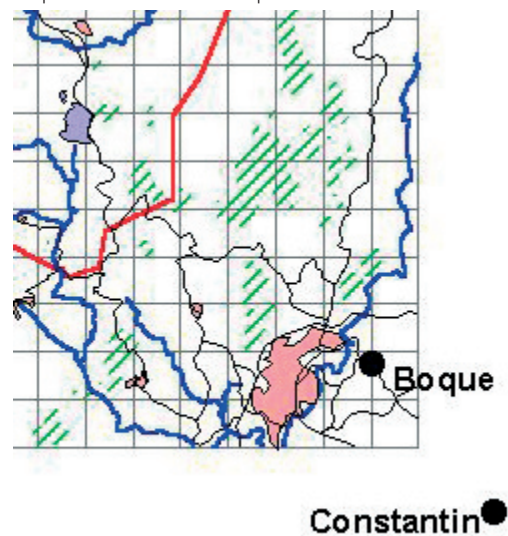


Fig. 3. Molar file of *Talpa occidentalis* (A) and *T. europaea* (B) seen as from the cheek side; mark on bicuspid (reversed bishop's mitre) the middle cusp at *T. occidentalis*.

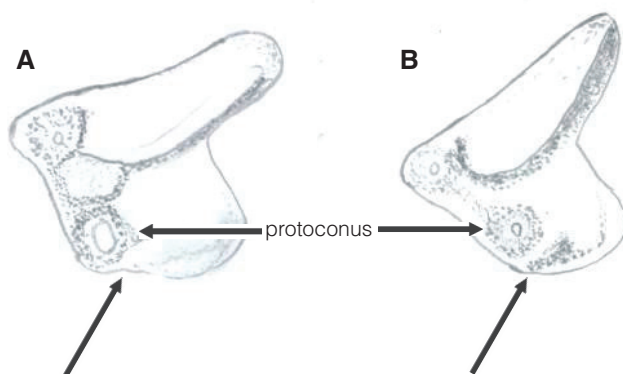


Fig. 2. Molars (P4 left) of *Crocidura russula* (A) and *C. suaveolens* (B) seen as from the base; at *C. russula* the protoconus lie directly to the edge and the profile of this edge forms a more or less straight angle whereas the protoconus lie at *C. suaveolens* further from the edge and the profile of the edge is round.

	Microtus-group i.s.s.				formal Pitymys-group	
	<i>M. arvalis</i>	<i>M. cabreræ</i>	<i>M. agrestis</i>	<i>M. gerbei</i>	<i>M. duodecimcostatus</i>	<i>M. lusitanicus</i>
Skull profile	convex	convex	convex	convex	convex	straight
Teethings	orthodont	orthodont	orthodont	orthodont	proödont ++	proödont +
Diastema					> 7.5 mm	< 7.5 mm
M ² agrestislus	neg	neg	pos	neg	neg	neg
M ³ nominal	pos	pos	pos	neg	neg	neg
M ³ simplex savii	neg	neg	neg	pos	neg	neg
M ³ simplex ibericus	neg	neg	neg	neg	pos	pos
Foramen ovale	undivided	?	undivided		undivided/small	
Foramen mandibulae	front	back	back		front	
Kop M ₁ labiaal	shared	undivided	shared	shared	shared	shared
M ₁ square	neg	neg	neg	pos	pos	pos
M ₂ square	neg	neg	neg	pos	pos	pos

Table 11, Important skull characteristics of in distinguishing between voles in the Iberian Peninsula

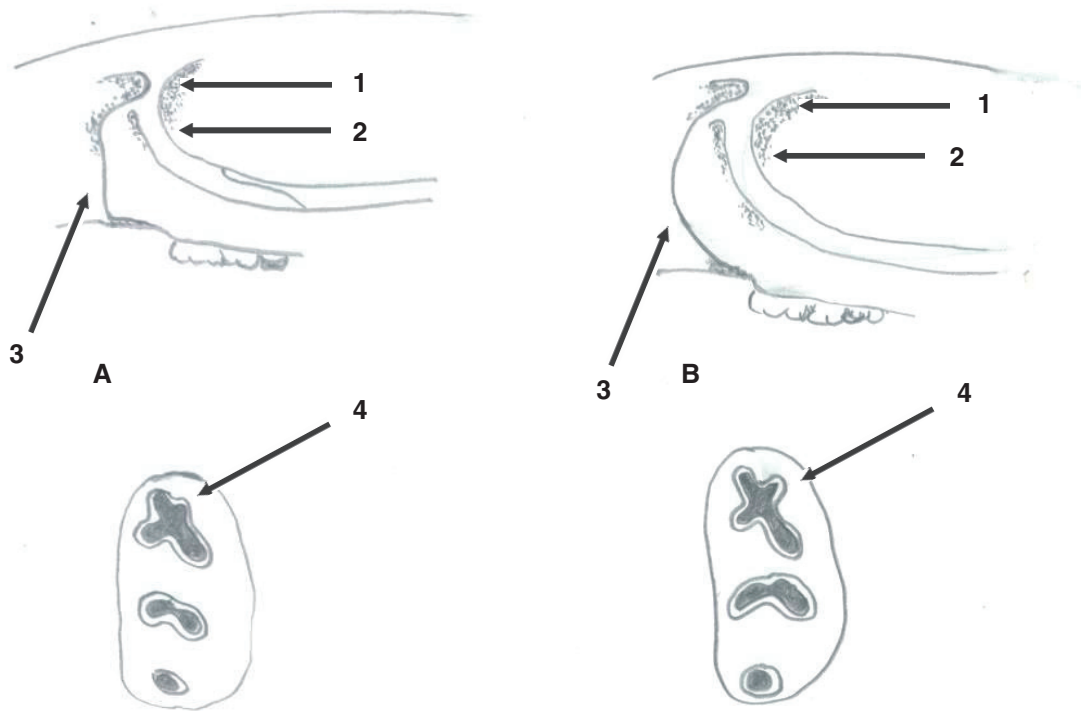


Fig. 4. Skull fragment and first molar base (M1 left) of sparrow domesticus (A) and *M. spretus* (B) seen as from the top aspect. At *M. domesticus* the beginning (1) of the cheekbone arc is halfly this way broad such as the arc himself (2). further is the profile of the first part of the cheekbone arc (3) at *M. domesticus* almost right and at *M. spretus* round. To the first molar base (M1 left) only a beginning of quadri cuspid (4) is at *M. domesticus*; at *M. spretus* quadri cuspid have been pronounced more.

and the group that used to be called Pitymys. The *Microtus* group in the narrower sense consists of *M. arvalis*, *M. cabreræ* and *M. agrestis*; their common denominator is the lack of a rhombus on the first and second molar in the lower jaw. Further description of these characteristics in both species can be found in Lange e.a. (1986).

Significant skull characteristics of *M. cabreræ* can be found in table 11; the “undented” head of the first molar in the lower jaw and the foramen mandibulare’s backward position (similar to *M. agrestis*). The Pitymys group have the rhombus (on the first and second molar in the lower jaw) in common. A

characteristic of *M. duodecimocostatus* is pro-odontia, forward-pointing incisors. A diastema length surpassing 7.5 millimetres is an important characteristic. An even skull profile, slight pro-odontia combined with a diastema length of less than 7.5 millimetres indicate *M. lusitanicus*. Furthermore, the middle bulge on the third upper jaw molar on the cheek side has a hardly developed triangle; a fully developed triangle and the absence of pro-odontia determine *M. gerbei*. The Algerian mouse (*Mus spretus*) was recently (Mammal Species of the World, 1993) distinguished from the House mouse (*Mus domesticus*), and therefore merits separate mention. The differences between both in pellet material can be found in the front end and the processus zygomaticus (cheekbone) attachment and the amount of well developed lobes on M1 (fig. 4). The characteristic dent in 1 supp. is absent sometimes in *Mus domesticus*, so it is not a reliable difference with *M. spretus*.

Results

Species encountered (dead animals and birds in owl pellets) are included in Appendix D with their English, scientific, Dutch and Portuguese names.

Owl pellets

A total of at least 365 vertebrate preys (362 mammals) was found, in nine groups: eight mammal groups and one bird group. In the vast amount of pellets four species were found most often; 89% were Lusitanian pine vole, Wood mouse, Field vole or Greater white-toothed shrew. Insectivora in both pellet heaps was 16%, Microtidae 49% and Muridae 33.4%. A special find were skull remains of an Iberian mole (*Talpa occidentalis*). Numbers of species found in pellets are listed below. The results are in table 12.

Miller's water shrew (*Neomys anomalus*)

A number of two specimens found meant 0.5% of the prey total (8th place). Finding Miller's water shrew in Boque was a first there. Its presence there was unknown.

Greater white-toothed shrew (*Crocidura russula*)

The amount of Greater white-toothed shrews was 52, 14.2% of the prey total (4th place). This common species was found both in pellets from Boque and pellets from Constantim.

Iberian mole (*Talpa occidentalis*)

Of this small mole species three specimens (0.8%) were found. This common species was found both in pellets from Boque and pellets from Constantim. It shares 6th and 7th place with the Southern watervole.

	Boque	Constantin	Total
<i>Southern watervole (Arvicola sapidus)</i>			
Of this common species three specimens were found, both in pellets from Boque and Constantim.			
<i>Neomys anomalus</i>	2		2
<i>Crocidura russula</i>	52	4	56
<i>Talpa occidentalis</i>	2	1	3
<i>Arvicola sapidus</i>	3		3
<i>Microtus lusitanicus</i>	114	4	118
<i>Field vole (Microtus agrestis)</i>			
Of a different vole, the Field vole, we found 58 specimens (15.9%). The Field vole reached 3 rd place. It was present both in pellets from Boque and Constantim.			
<i>Microtus agrestis</i>	55	3	58
<i>Apodemus sylvaticus</i>	92	1	93
<i>Mus spretus</i>	26	3	29
<i>Aves</i>	3		3
Total	349	16	365

Table 12, Amount of preys found in owl pellets per location

Lusitanian pine vole (Microtus lusitanicus)

The presence of 118 specimens (32%) made it the most numerous species in the pellet material. It is relatively large and the most important staple food for the Barn owl. This common species was found in pellets from Boque and Constantim.

Wood mouse (Apodemus sylvaticus)

The Wood mouse numbered 93 specimens (25.5%), the 2nd most numerous in the pellet material. This common species was found in pellets from Boque and Constantim.

Algerian mouse

The Algerian mouse numbered 29 specimens (7.9%) and occupied 5th place. This common species was found in pellets from Boque and Constantim.

Dead animals

Fatalities encountered both inside and outside traps are listed in table 13. Of a total of eleven dead Mice nine were found inside traps and two outside. Out of five Greater white-toothed shrews, four had to be determined on the basis of skull characteristics.

Date	species	sex	HB	T	HF	EAR	W	UTM 29T	location
25-07	Neomys anomalus		78,9	53,4	14		13,5	0600359 - 4576112	Ribeira de Arnal (trap)
26-07	Crocidura russula		76,1	39,8	11,6		8,2	0601921 - 4579157	Lamas de Olo (mountain : 1100m)
27-07	Apodemus sylvaticus	M	65,5	79,2	18,6	13,5	9	0600366 - 4576073	Rio Olo trap location 2 (820 m)
27-07	Neomys anomalus		60	56.4	14.4		8,5	0600359 - 4576112	Ribeira de Arnal (trap)
27-07	Crocidura russula		57,3	37			5,5	0600040 - 4576620	Ribeira de Arnal (trap nr. 467)
29-07	Talpa occidentalis							0599802 - 4576932	Rio Arnal trap location 6
29-07	Apodemus sylvaticus		75,1	94,3	22,6	12	20,5	0599802 - 4576932	Rio Arnal : trap location 6 (trap nr. 430)
29-07	Neomys anomalus		74	54	11,8		16,7	0600150 - 4576834	Ribeira de Arnal (trap)
29-07	Crocidura russula		64	32,6	11,2		6,2	0600150 - 4576834	Ribeira de Arnal (trap)
29-07	Crocidura russula		62	39	9,7		5,5	0600150 - 4576834	Ribeira de Arnal (trap nr. 474)
30-07	Crocidura russula		57,6	35,6	11,9		4,7	0600169 - 4576875	Ribeira de Arnal (trap)

Table 13, Mammal fatalities measured and located

6 RECORDS OF OTHER MAMMALS

Beyond a doubt, our most exciting mammal encounter during our stay in Portugal was catching the Pyrenean desman (*Galemys pyrenaicus*). From Iberian moles to Wolves, a total of fifteen additional species was recorded, not including Bats, live trap catches or pellet findings described in other chapters.

Methods

Apart from the excluded methods mentioned above, during excursions on foot or by car we recorded the following categories:

- Sightings of individual animals;
- Special catches in desman trap or by hand;
- Dead animals;
- Droppings;
- Signs of foraging or eating;
- Habitation tracks (burrows, molehills).

The Desman traps consisted of a series of three fyke nets. At three locations about 100 metres equidistant the fyke nets blocked the full width of the brook bed.

Only part of the Park was covered in this way. Vast areas are hardly accessible and our time was limited. The north-western part and the middle south of the Park lack roads. Map 3 show the areas where observations were made.

Species

In total we encountered (tracks of) fifteen mammal species. Details on all species are listed in Appendix E. The distribution of the mammals is shown on maps in the back of the paper.

Greater white-toothed shrew (Crocidura russula).

One specimen was found dead. Both Greater white-toothed shrew and Lesser white-toothed shrew are present in the area. Which is which cannot be determined, except by comparing skull characteristics.

Pyrenean desman (Galemys pyrenaicus).

The Pyrenean desman's only habitat is in the northern part of the Iberian Peninsula. This "aquatic mole" favours fast-running water, with low temperatures and a high oxygen content. As a species the Desman is vulnerable. Water abstraction, pollution, destruction of riparian vegetation and the construction of hydro-electric dams are the main threats. In north-east Portugal accidental captures in fish nets pose a fatal problem.

One Pyrenean desman was actually caught in the Ribeira do Arnal, a brook in the southern part of the Park. We used a series of closely surveyed fyke nets to determine its presence. Fresh droppings were collected at other locations as well, along the Ribeira do Arnal and alongside the Rio Olo. Typically, droppings are deposited in small (1 metre) brook side indentations.

Iberian mole (Talpa occidentalis).

Portugal and Spain are habitats to an endemic Mole species, the Iberian mole. It is common enough and in the Alvão region we found its tracks in several meadows. Positive identification was possible due to the fact it is the only Mole species in the area. But we had to allow for the possible presence of another digging species, the Water vole. Its underground burrows resemble those of European moles, but in this part of Europe is far from common. At one location near the Rio Olo an Iberian mole was sighted.

Rabbit (Oryctolagus cuniculus).

The Rabbit is a common species both in Portugal and elsewhere in Europe. All European rabbits originally descend from the Iberian Peninsula, spread by man and nature from Roman times onwards.

Red squirrel (Sciurus vulgaris).

Tracks of eating were found in four locations, two within the boundaries of the Park. These locations are in the north, near Anta village.

In Portugal the Red squirrel is present only in the north. For about 400 years it was absent due to heavy grazing, according to some. To provide fresh grass for goats and sheep woodland is regularly burned down. Towards the end of the twentieth century many forests were replanted, mainly pine. Recently the Squirrel moved in from Spain. It was first sighted in the north of Portugal in the middle nineties and since then, their numbers rose significantly.

Southern water vole (Arvicola sapidus).

This water vole was sighted near Arnal and under a bridge near Lamas de Olo. This species is always associated with water, most often slow-streaming water. Burrows are dug into banks. The closely related species *Arvicola terrestris*, with an aquatic form, is absent in Portugal, except for the extreme northeast.

Lusitanian pine vole (Microtus lusitanicus).

At a location near Açureira, burrows were found to belong to the Lusitanian pine vole. This vole occurs only in Portugal and northern Spain. Its burrows can be found in deep soil, mainly in meadows, pastures and tilled fields, also close to low dry stone walls. A vertical tunnel in a small molehill-like pile of earth is a characteristic.

Wood mouse (Apodemus sylvaticus).

One Wood mouse showed itself in the daytime. The closely related Yellow-necked wood mouse is not present in Portugal.

Apodemus sylvaticus





Traplocation at campsite

Black rat (*Rattus rattus*).

Black rats were sighted at two locations in the Park, once near the Rio Olo (six specimens), another in a canastro in Anta village.

Garden dormouse (*Eliomys quercinus*).

Dormice can be seen between rocks and shrubs on the slopes, but also on the ceiling of the Ecological School in Arnal. One individual was caught by hand in the kitchen. Few known habitats in Portugal accommodate the Garden dormouse.

Wolf (*Canis lupus*).

About seventeen Wolf packs live in northern Portugal. Three packs live in or near the Alvão Natural Park; in the eastern, southern and west-northwestern areas. Park staff members closely monitor their dispersal, breeding and hunting forays. To the north of the Park a fourth pack seems to roam the countryside, but there is scant information about this group.

A number of locations throughout the area yielded droppings recorded in the course of our fieldwork.

Red fox (*Vulpes vulpes*).

Red foxes show themselves by day and by night. Droppings were found. The Red fox is common throughout Portugal.

Weasel (*Mustela nivalis*).

In the close vicinity of the Arnal Ecological School a Weasel had its habitat. It was frequently observed crossing the road, once with prey.

Otter (*Lutra lutra*).

Otter spraints (droppings) were found in three locations in the Park along the Rio Olo. A fourth location lies near Bobal. Water quality is an important factor in Otter welfare. Otters are found throughout Portugal.



Crocidura russula

Wild boar (*Sus scrofa*).

Snouting Wild boar looking for food left tracks in the soil in a number of locations. There was a caveat however; near the village of Lamas de Olo local people kept a wild-looking boar. Having escaped upon occasion, it may have left misleading tracks.

Conclusions

In the course of our stay in the Park we recorded tracks and sightings of fifteen mammal species (Appendix E). A comprehensive list of all encountered mammal species during the camp is included in Appendix F.

Of these species, the Pyrenean desman was the most special. Otter, Wolf, Iberian Mole and Red squirrel also left interesting tracks.

Apart from tracks identified definitely, some cat droppings found near the Park, north of Bobal, may have been from a Wild cat (*Felis silvestris*). As it is hard to distinguish between the true Wild cat and a domestic cat gone wild, determination was uncertain. Also, another cat species has its habitat in this area, the Common genet (*Genetta genetta*). One set of droppings, found north of the Park, was hesitantly attributed to this species. The droppings contained a lot of prey hair.

Although the Western hedgehog (*Erinaceus europaeus*) has been recorded in the Park before, we did not observe it. At one location droppings were found that may have been a hedgehog's, but this was too uncertain to record.

We saw the Weasel, but not the Stoat (*Mustela erminea*). The latter reaches its southernmost distribution in the north of Portugal, but it does inhabit the Alvão region. In a comparable fashion, Stone and Pine marten (*Martes foina*, *Martes martes*) and Roe deer (*Capreolus capreolus*) were not recorded. The Brown rat (*Rattus norvegicus*) is known to live in the north of Portugal, but we only encountered its sister species, the Black rat (*Rattus rattus*).

7 RECORDS OF NON-MAMMAL SPECIES

Although our activities in Portugal focused on mammals, other forms of wildlife were recorded as well. This chapter contains a concise description of birds, amphibians, reptiles, butterflies and dragonflies observed. Other groups are not described for lack of sufficient observations.

Birds

A total of 78 bird species was observed. A full list is included in Appendix G. The distribution maps are included in maps in the back of the paper.

Many Mediterranean birds were absent in the Park because many subtropical species do not dwell in Portugal's colder mountainous zones. Many bird species observed in the Park are known to live in Europe's moderate climates.

Birds of prey were relatively scarce. Only Montagu's harrier (*Circus pygargus*) was regularly seen hunting over rocky slopes. Many other species were observed only once, such as the Short-toed eagle (*Circaetus gallicus*), Bonelli's eagle (*Hieraetus fasciatus*), and Peregrine falcon (*Falco peregrinus*). Over granite formations and moraine slopes and around the campsite building Carrion crows (*Corvus corone*) and small groups of Red-billed choughs (*Pyrrhonorax pyrrhonorax*) were seen. The Common raven (*Corvus corax*) was seen different times around the campsite building.

Along the Rio Olo we regularly saw Grey wagtail (*Motacilla cinerea*), Dipper (*Cinclus cinclus*) and occasionally a Common kingfisher (*Alcedo atthis*).

In the shrubbery near the campsite building we often admired the Dartford warbler (*Sylvia undata*), as well as the Common stonechat (*Saxicola torquata*) and Rock bunting (*Emberiza cia*). This late in the season not many birds sang in the sunny woods. The often-heard call of the Green woodpecker

Is it a bird?



Butterfly's are difficult, aren't they





Triturus boscai

(*Picus viridis*) was misleading, because this call differed slightly from what we are used to in Holland. Several times a Hoopoe (*Upupa epops*) was seen.

Although we frequently roamed outdoors in the night time, we did not observe all that many night birds. European nightjars (*Caprimulgus europaeus*) were reported regularly. Some Little owls (*Athene noctua*) and Barn owls (*Tyto alba*) were seen. In the woods we often heard the Tawny owl (*Strix aluco*).

Amphibians and Reptiles

A total of nine amphibian species and eleven reptile species were recorded. They are listed in Appendix H. The distribution maps are included in maps in the back of the paper. Perhaps the most spectacular observation was a Golden-striped salamander (*Chioglossa lusitanica*). This species is endemic in the Spanish northwest and northern Portugal. Like the Pyrenean desman the Golden-striped salamander occupies a relatively small area, mainly determined by the amount of rainfall. Golden-striped salamanders were seen in different locations, both in mountain brooks in wooded areas and in wet meadows near Arnal. Outside the Park, one specimen was found under a dead tree.

Another salamander species regularly observed was Bosca's newt (*Triturus boscai*). This salamander closely resembles the Smooth newt (*Triturus vulgaris*, Kleine watersalamander) absent from the Iberian Peninsula. In a small cave near Rio Arnal we found Fire salamander (*Salamandra salamandra*) larvae; Marbled newt (*Triturus marmoratus*) larvae were also spotted.

Because there were no rainy nights during this camp, amphibians were not a focus of study. Most numerous by far were Perez' frog (*Rana perezi*) and the Iberian frog (*Rana iberica*). Both species were seen daily in brooks and rivulets. During nightly action with mist nets we occasionally heard Midwife toads (*Alytes obstetricans*). Once a Natterjack (*Bufo calamita*) was seen. During nightly mouse trap checks we regularly saw Common toads (*Bufo bufo*) of enormous girth (Subspecies *spinozus*). Schreiber's green lizards (*Lacerta schreiberi*) could be seen regularly on stones near the Rio Olo. Occasionally one was found in a trap. Ocellated lizards were seen regularly in the drier regions. They were also spotted around the campsite building. A dangerously thin young male was taken to the

camp site building after being found in a pail in Dornelas village. It had become too weak to climb out of the pail.

On the walls alongside tracks and roads Iberian wall lizards (*Podarcis hispanica*) were very numerous in places and Bocage's wall lizards (*Podarcis bocagei*) in smaller numbers. Occasionally we observed Large psammodromuses (*Psammodromus alginus*). Tree-toed skinks (*Chalcides chalcides*) drew a lot of attention in grassy areas near Rio Olo.

Snakes were rare. In the north-eastern part of the Park a Montpellier snake (*Malpolon monspessulanus*) was seen. During a bat colony count in Ermelo a Ladder snake (*Elaphe scalaris*) was reported. Viperine snakes (*Natrix maura*) were spotted a few times in or near the water. Once a dead Grass snake (*Natrix natrix*) was seen in water; apparently it had been beaten to death. Thanks to a farmer in the region we could handle a Smooth snake (*Coronella austriaca*).

Butterflies

In the Park a reasonable amount of daytime butterfly species were present. We counted 59 species and 3 night time butterflies active in the daytime. Their English, scientific and Dutch names are in Appendix I. The distribution maps are included in maps in the back of the paper. Some of the species are common throughout Europe. A small number were so numerous we saw them literally everywhere, such as Small skipper (*Thymelicus sylvestris*), Gatekeeper (*Pyronia tithonus*), Clouded yellow (*Colias croceus*), Spanish marbled white (*Melanargia lachesis*), Long's short-tailed blue (*Leptotus pirihous*), Silver-studded blue (*Plebeius argus*), Rock grayling (*Hipparchia alcyone*) and Great banded grayling (*Brintesia circe*). Small wood stands, brooks and rills near Arnal were especially rich terrains for butterflies active in the daytime, such as Mallow skipper (*Carcharodus alceae*), Wood white (*Lepidea sinapis*) and Chapman's blue (*Polyommatus thersites*). Blue-spot hairstreak (*Satyrium spini*) and even False ilex hairstreak (*Satyrium esculi*) were found here.

On small tilled fields, such as can be found around Ermelo, Small pearl-bordered fritillary (*Boloria selene*) populations were seen. In fewer places a Camberwell beauty (*Nymphalis antiopa*) was spotted. In marshy tree stands alongside brooks we found the Silver-washed fritillary (*Argynnis paphia*) in places, as well as the Spanish subspecies of the Speckled wood (*Pararge aegeria*).

Look in the puppits of my eyes





Boyeria irene

In open areas with a lot of granite we saw Lulworth skipper (*Thymelicus acteon*), Silver-spotted skipper (*Hesperia comma*), Striped grayling (*Hipparchia fidia*), Grayling (*Hipparchia semele*), Dusky heath (*Coenonympha dorus*), Adonis blue (*Polyommatus bellargus*), Southern brown argus (*Acrici cramea*) and Large wall brown (*Lasiommata maera*).

One special observation was a Lesser purple emperor (*Apatura ilia*), ready to be admired on a stone bridge over the Rio Olo. Exceptional to the Portuguese was the Alcon blue (*Maculinea alcon*); a few populations were encountered around the Rio Olo.

Dragonflies and Damsels

In the Park we counted 22 dragonfly species. A list can be found in Appendix J, and their distribution maps are included in maps aa-a'a'. Information regarding dragonflies being scarce, this was an excellent occasion to augment Park data.

Alongside brooks Beautiful demoiselle (*Calopteryx virgo*), Onchogomphus uncatus (Grote tanglibel), Golden-ringed dragonfly (*Cordulegaster bontonii immaculifrons*) were numerous, *Boyeria irene* (Schemerlibel) less so. Around

Ermelo along the Rio Olo we also observed *Calopteryx haemorrhoidalis* (Koperen beekjuffer), *Calopteryx xanthostoma* (Iberische beekjuffer) and *Platycnemis latipes* (Witte breedscheenjuffer). Both the Norfolk hawker (*Aeshna isosceles*) and the Southern hawker (*Aeshna cyaena*) were observed once in the vicinity of brooks. Over larger waters an Emperor dragonfly (*Anax imperator*) was seen hunting a few times.

The most spectacular find was an Orange-spotted emerald (*Oxygastra curtisii*). This species was later recognised in flight by the shape of its body.

Sympetrum were scarce and mostly confined to the Ruddy darter (*Sympetrum sanguineum*) and the occasional Red-veined darter (*Sympetrum fonscolombii*).

The small oozing fen in the southwest corner of the lesser dam yielded other dragonfly species, such as Scarlet dragonfly (*Crocothemis erythraea*), Common blue damselfly (*Enallagma cyathigerum*), Scarce blue-tailed damselfly (*Ischnura pumilio*), Lestes virens vestalis (Tengere pantserjuffer), Small red damselfly (*Cerciagrion tenellum*), Large red damselfly (*Pyrrhosoma nymphula*) and Four-spotted chaser (*Libellula quadrimaculata*).

SUMMARY

From July 26th till August 2nd, 2003, the VZZ Veldwerkgroep of the Dutch Society for the Study and Protection of Mammals (Vereniging voor Zoogdierkunde en Zoogdierbescherming, VZZ) paid a visit to the Alvão Natural Park in Portugal. This workshop is a traditional part of the VZZ's yearly program, aimed at surveying mammal species which are rare or absent in the Netherlands, and to extend and exchange knowledge of survey methods geared to diverse species. Secondly, the VZZ workshops abroad aim to enlarge the knowledge of presence and abundance of mammals, and to a lesser extent other fauna groups, in a given area. Foreign workshops invariably take place in co-operation with a local organisation in order to fulfil not only the VZZ aims, but also those of our counterparts working and living in the area. In this way the information gathered is more likely to find its way in the protection and management of the area in general, and of mammals in particular.

The 2003 workshop was organised in co-operation with the management of Alvão Natural Park. The Park is situated in the north-eastern part of Portugal, in the province of Trás-os-Montes. Alvão Natural Park covers vast areas of open, mountainous land as well as rich deciduous forests on the westerly slopes. In the valleys enclosing rivers and brooks, land is cultivated on a minor scale. Here we find meadows, pastures and tilled fields.

In surveying bats, one of our core activities, we applied almost all available methods -- the use of bat detectors, mist nets, and checking for roosts in any type of building. This produced a large amount of new data on bat roosts (canastros, stone bridges, dilapidated mines), and the species present in the area. Five out of fifteen species present were observed in Alvão Natural Park for the very first time -- Brown long-eared bat (*Plecotus auritus*), Grey long-eared bat (*P. austriacus*), Lesser horseshoe bat (*Rhinolophus hipposideros*), Greater horseshoe bat (*R. ferrumequinum*) en Geoffroy's bat (*Myotis emarginatus*). Leisler's bat (*Nyctalus leisleri*) appeared to be widespread.

At seven locations in the south-eastern part of Alvão Natural Park, small mammals were surveyed by setting out a variety of lined up live traps. A total of nine species of mice and shrews were caught. Appendix C allows an overview. Catching a Pyrenean desman (*Galemys pyrenaicus*) was one of the highlights of this year's workshop. This milestone, requiring a substantial effort, was finally reached by using especially designed fyke nets.

In analysis of Barn owl pellets from two locations outside the Park at least eight mammal species were detected. Among these, Lusitanian pine vole (*Microtus lusitanicus*), Wood mouse (*Apodemus sylvaticus*) and Algerian mouse (*Mus spretus*) were the most numerous.

In addition, we encountered mammal species such as Wolf (*Canis lupus*), Wild boar (*Sus scrofa*), Red squirrel (*Sciurus vulgaris*), Weasel (*Mustela nivalis*) and Otter (*Lutra lutra*).

Apart from mammals, we gave considerable attention to butterflies and dragonflies. This yielded observations of 59 butterfly species and at least 22 dragonfly species. The latter observation means quite an extension of knowledge of this group.

A good many amphibians and reptiles were observed, all known to live in the area. Several new sightings of less common species, such as the Gold-striped salamander (*Chioglossa lusitanica*), were put on record.

LITERATURE

Agreement on the Conservation of Populations of European Bats: Report on Implementation of the Agreement in Portugal, 2003. 4th Meeting of the Parties in the Bats Agreement.

See also [http://www.eurobats.org/Party Reports/index.htm](http://www.eurobats.org/Party%20Reports/index.htm)

BICHO, S.R.; Influência dos morcegos em áreas protegidas: Parque Natural do Alvão Natural Park de Montesinho. Relatório final do estudo integrado no programa “Conhecimento e gestão do património natural”. Instituto da conservação da Natureza, Lisboa, Portugal, 1994.

BOS, F. & M. WASSCHER; Veldgids Libellen; Stichting Uitgeverij KNNV, Utrecht 1997.

JONSSON, L.; Vogels van Europa, Noord-Afrika en het Midden-Oosten; BV Uitgevermaatschappij Tirion. Baarn, 1994.

MITCHELL-JONES, A.J., et al.; The Atlas of European Mammals; T&A Poyser, London, 1999.

NÖLLERT, A. & C. NOLLERT; Amfibieëngids van Europa. Tirion Uitgevers BV. Baarn, 2001.

LANGE et al; Zoogdieren van West-Europa; Utrecht, KNNV Uitgeverij, 1986

SCHÖBER, W & E. GRIMMBERGER.; Fledermause Europas; Stuttgart: Franck's Verlag, 1978.

TOLMAN, T. & R. LEWINGTON; De nieuwe Vlindergids, 50 soorten dagvlinders van Europa en Noord-west-Afrika; Tirion Uitgevers BV, Baarn, 1999.

WILSON, D.E. & D.M. Reeder (eds.); Mammal Species of the World; Smithsonian Institution Press, 1993.

WYNHOFF, I., et al.; Dagvlinders van de Benelux; Stichting Uitgeverij KNNV, Utrecht, 1992.

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APPENDIX A – LIST OF PARTICIPANTS

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APPENDIX B – BAT SPECIES

English	Scientific	Dutch	Portuguese
Greater horseshoe bat	<i>Rhinolophus ferrumequinum</i>	Grote hoefijzerneus	Morcego-de-ferradura-grande
Lesser horseshoe bat	<i>Rhinolophus hipposideros</i>	Kleine hoefijzerneus	Morcego-de-ferradura-pequeno
Daubenton's bat	<i>Myotis daubentonii</i>	Watervleermuis	Morcego-de-água
Whiskered bat	<i>Myotis mystacinus</i>	Kleine baardvleermuis	Morcego-de-bigodes
Geoffroy's bat	<i>Myotis emarginatus</i>	Ingekorven vleermuis	Morcego-lanudo
Natterer's bat	<i>Myotis nattereri</i>	Franjestaart vleermuis	Morcego-de-franja
Serotine	<i>Eptesicus serotinus</i>	Laatvlieger	Morcego-hortelão
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	Gewone dwergvleermuis	Morcego-anão
Kuhl's pipistrelle	<i>Pipistrellus kuhli</i>	Kuhls dwergvleermuis	Morcego de Kuhl
Savi's pipistrelle	<i>Pipistrellus (Hypsugo) savii</i>	Savi's dwergvleermuis	Morcego de Savii
Brown long-eared bat	<i>Plecotus auritus</i>	Bruine grootoorvleermuis	Morcego-orelhudo-castanho
Grey long-eared bat	<i>Plecotus austriacus</i>	Grijze grootoorvleermuis	Morcego-orelhudo-cinzento
Barbastelle	<i>Barbastella barbastellus</i>	Mopsvleermuis	Morcego-negro

APPENDIX C – MAMMALS IN LIVE TRAPS

English	Scientific	Dutch	Portuguese
Spanish shrew	<i>Sorex granarius</i>	Iberische bosspitsmuis	Musaranho-de-dentes-vermelhos
Miller's water shrew	<i>Neomys anomalus</i>	Millers waterspitsmuis	Musaranho-de agua
Greater white-toothed shrew	<i>Crocidura russula</i>	Huisspitsmuis	Musaranho-de dentes-brancos
Pyrenean desman	<i>Galemys pyrenaicus</i>	Pyreneese desman	Toupeira-de-agua
Lusitanian pine vole	<i>Microtus lusitanicus</i>	Baskische woelmuis	Rato-cego
Wood mouse	<i>Apodemus sylvaticus</i>	Bosmuis	Rato-do-campo
Western house mouse	<i>Mus domesticus/musculus</i>	Huismuis	Rato-caseiro
Algerian mouse	<i>Mus spretus</i>	Algerijnse muis	Rato-das-hortas
Garden dormouse	<i>Eliomys quercinus</i>	Eikelmuis	Leirao ; Rato-dos-pomares

APPENDIX D – MAMMALS FOUND IN OWL PELLETS

English	Scientific	Dutch	Portuguese
Miller's water shrew	<i>Neomys anomalus</i>	Millers waterspitsmuis	Musaranho-de agua
Greater white-toothed shrew	<i>Crocidura russula</i>	Huisspitsmuis	Musaranho-de dentes-brancos
Iberian mole	<i>Talpa occidentalis</i>	Iberische blinde mol	Toupeira/T de Cabrera
Southern water vole	<i>Arvicola sapidus</i>	West-Europese woelrat	Rato-de agua
Field vole	<i>Microtus agrestis</i>	Aardmuis	Rato-do-campo-de-rabo-curto
Lusitanian pine vole	<i>Microtus lusitanicus</i>	Baskische woelmuis	Rato-cego
Wood mouse	<i>Apodemus sylvaticus</i>	Bosmuis	Rato-do-campo
Algerian mouse	<i>Mus spretus</i>	Algerijnse muis	Rato-das-hortas

APPENDIX E – OTHER OBSERVED MAMMALS

English	Species		Method category				
	Scientific	sightings	catch	dead	droppings	eating	habitation
Greater white-toothed shrew	<i>Crocidura russula</i>			X			
Pyrenean desman	<i>Galemys pyrenaicus</i>		X		X		
Iberian mole	<i>Talpa occidentalis</i>	X					X
Rabbit	<i>Oryctolagus cuniculus</i>	X			X		
Red squirrel	<i>Sciurus vulgaris</i>					X	
Southern water vole	<i>Arvicola sapidus</i>	X			X		
Lusitanian pine vole	<i>Microtus lusitanicus</i>						X
Wood mouse	<i>Apodemus sylvaticus</i>	X					
Black rat	<i>Rattus rattus</i>	X					
Garden dormouse	<i>Eliomys quercinus</i>	X	X				
Wolf	<i>Canis lupus</i>				X		
Red fox	<i>Vulpes vulpes</i>	X			X		
Weasel	<i>Mustela nivalis</i>	X					
Otter	<i>Lutra lutra</i>				X		
Wild boar	<i>Sus scrofa</i>					X	

Fifteen species of 'other mammals' are recorded in six different ways.

APPENDIX F – COMPLETE LIST OF MAMMALS AND TYPE OF OBSERVATION

English	Scientific	In live traps	In owl pellets	Sights	Tracks	Mist net	Bat detector
Spanish shrew	<i>Sorex granarius</i>	x					
Miller's water shrew	<i>Neomys anomalus</i>	x	x				
Greater white-toothed shrew	<i>Crocidura russula</i>	x	x		x		
Pyrenean desman	<i>Galemys pyrenaicus</i>	x			x		
Iberian mole	<i>Talpa occidentalis</i>		x	x	x		
Greater horseshoe bat	<i>Rhinolophus ferrumequinum</i>			x		x	x
Lesser horseshoe bat	<i>Rhinolophus hipposideros</i>			x		x	x
Daubenton's bat	<i>Myotis daubentonii</i>			x		x	x
Geoffroy's bat	<i>Myotis emarginatus</i>			x			
Whiskered bat	<i>Myotis mystacinus</i>			x		x	
Natterer's bat	<i>Myotis nattereri</i>						x
Kuhl's pipistrelle	<i>Pipistrellus kuhlii</i>					x	x
Common pipistrelle	<i>Pipistrellus pipistrellus</i>			x		x	x
Savi's pipistrelle	<i>Pipistrellus (Hypsugo) savii</i>					x	
Leisler's bat	<i>Nyctalus leisleri</i>			x			x
Serotine	<i>Eptesicus serotinus</i>			x	x	x	x
Barbastelle	<i>Barbastella barbastellus</i>					x	x
Brown long-eared bat	<i>Plecotus auritus</i>			x		x	
Grey long-eared bat	<i>Plecotus austriacus</i>			x		x	
European free-tailed bat	<i>Tadarida teniotis</i>			x			x
Rabbit	<i>Oryctolagus cuniculus</i>			x	x		
Red squirrel	<i>Sciurus vulgaris</i>				x		
Southern water vole	<i>Arvicola sapidus</i>		x	x	x		
Field vole	<i>Microtus agrestis</i>		x				
Lusitanian pine vole	<i>Microtus lusitanicus</i>	x	x		x		
Wood mouse	<i>Apodemus sylvaticus</i>	x	x	x			
Black rat	<i>Rattus rattus</i>			x			
Western house mouse	<i>Mus domesticus</i>	x					
Algerian mouse	<i>Mus spretus</i>	x	x				
Garden dormouse	<i>Eliomys quercinus</i>	x		x			
Wolf	<i>Canis lupus</i>				x		
Red fox	<i>Vulpes vulpes</i>			x	x		
Weasel	<i>Mustela nivalis</i>			x			
Otter	<i>Lutra lutra</i>				x		
Wild boar	<i>Sus scrofa</i>				x		

APPENDIX G - BIRDS

English	Scientific	Dutch
Montagu's harrier	<i>Circus pygargus</i>	Grauwe kiekendief
Eurasian sparrowhawk	<i>Accipiter nisus</i>	Sperwer
Northern goshawk	<i>Accipiter gentilis</i>	Havik
Honey buzzard	<i>Pernis apivorus</i>	Wespendief
Common buzzard	<i>Buteo buteo</i>	Buizerd
Golden eagle	<i>Aquila chrysaetos</i>	Steenarend
Bonelli's eagle	<i>Hieraetus fasciatus</i>	Havikarend
Short toed eagle	<i>Circaetus gallicus</i>	Slangenarend
Booted eagle	<i>Hieraetus pennatus</i>	Dwergarend
Common kestrel	<i>Falco tinnunculus</i>	Torenvalk
Hobby	<i>Falco subbuteo</i>	Boomvalk
Peregrine falcon	<i>Falco peregrinus</i>	Slechtvalk
Common sandpiper	<i>Actitis hypoleucos</i>	Oeverloper
Wood pigeon	<i>Columba palumbus</i>	Houtduif
Collared dove	<i>Streptopelia decaocto</i>	Turkse tortel
Turtle dove	<i>Streptopelia turtur</i>	Zomertortel
Common cuckoo	<i>Curculus canorus</i>	Koekoek
Barn owl	<i>Tyto alba</i>	Kerkuil
Tawny owl	<i>Strix aluco</i>	Bosuil
Little owl	<i>Athene noctua</i>	Stenuil
European nightjar	<i>Caprimulgus europaeus</i>	Nachtzwaluw
Common swift	<i>Apus apus</i>	Gierzwaluw
Pallid swift	<i>Apus pallidus</i>	Vale gierzwaluw
Common kingfisher	<i>Alcedo atthis</i>	IJsvogel
Hoopoe	<i>Upupa epops</i>	Hop
Dipper	<i>Cinclus cinclus</i>	Waterspreeuw
Green woodpecker	<i>Picus viridis</i>	Groene specht
Great spotted woodpecker	<i>Dendrocopos major</i>	Grote bonte specht
Sky lark	<i>Alauda arvensis</i>	Veldleeuwerik
Wood lark	<i>Lullula arborea</i>	Boomleeuwerik
Crag martin	<i>Ptyonoprogne rupestris</i>	Rotszwaluw
Red-rumped swallow	<i>Hirundo daurica</i>	Roodstuitzwaluw
Barn swallow	<i>Hirundo rustica</i>	Boerenzwaluw
House martin	<i>Delichon urbica</i>	Huiszwaluw
Tree pipit	<i>Anthus trivialis</i>	Boompieper
Pied wagtail	<i>Motacilla alba</i>	Witte kwikstaart
Grey wagtail	<i>Motacilla cinerea</i>	Grote gele kwikstaart
Yellow wagtail	<i>Motacilla flava iberiae</i>	Iberische gele kwikstaart
Wren	<i>Troglodytes troglodytes</i>	Winterkoning
Hedge accentor	<i>Prunella modularis</i>	Heggenmus
Black redstart	<i>Phoenicurus ochruros</i>	Zwarte roodstaart

Whinchat	<i>Saxicola rubetra</i>	Paapje
Common stonechat	<i>Saxicola torquata</i>	Roodborsttapuit
Blackbird	<i>Turdus merula</i>	Merel
Mistle thrush	<i>Turdus viscivorus</i>	Grote lijster
Dartford warbler	<i>Sylvia undata</i>	Provencaalse grasmus
Blackcap	<i>Sylvia atricapilla</i>	Zwartkop
Sardinian warbler	<i>Sylvia melanocephala</i>	Kleine zwartkop
Bonelli's warbler	<i>Phylloscopus bonelli</i>	Bergfluitier
Iberian chiffchaff	<i>Phylloscopus ibericus</i>	Iberische tijtjaf
Firecrest	<i>Regulus ignicapillus</i>	Vuurgoudhaantje
Pied flycatcher	<i>Ficedula hypoleuca</i>	Bonte vliegenvanger
Spotted flycatcher	<i>Muscicapa striata</i>	Grauwe vliegenvanger
Crested tit	<i>Parus cristatus</i>	Kuifmees
Blue tit	<i>Parus caeruleus</i>	Pimpelmees
Great tit	<i>Parus major</i>	Koolmees
Coal tit	<i>Parus ater</i>	Zwarte mees
Long-tailed tit	<i>Aegithalos caudatus</i>	Staartmees
Wood nuthatch	<i>Sitta europea</i>	Boomklever
Short toed treecreeper	<i>Certhia brachydactyla</i>	Boomkruiper
Great grey shrike	<i>Lanius excubitor</i>	Klapekster
Golden oriole	<i>Oriolus oriolus</i>	Wielewaal
Eurasian jay	<i>Garrulus glandarius</i>	Gaai
Magpie	<i>Pica pica</i>	Ekster
Red-billed chough	<i>Pyrrhocorax pyrrhocorax</i>	Alpenkraai
Eurasian jackdaw	<i>Corvus monedula</i>	Kauw
Common raven	<i>Corvus corax</i>	Raaf
Carrion crow	<i>Corvus corone</i>	Zwarte kraai
House sparrow	<i>Passer domesticus</i>	Huismus
Chaffinch	<i>Fringilla coelebs</i>	Vink
Bullfinch	<i>Pyrrhula pyrrhula</i>	Goudvink
Hawfinch	<i>Coccothraustes coccothraustes</i>	Appelvink
European serin	<i>Serinus serinus</i>	Europese kanarie
Green finch	<i>Carduelis chloris</i>	Groenling
Goldfinch	<i>Carduelis carduelis</i>	Putter
Linnet	<i>Carduelis cannabina</i>	Kneu
Corn bunting	<i>Miliaria calandra</i>	Grauwe gors
Rock bunting	<i>Emberiza cia</i>	Grijze gors

APPENDIX H - AMPHIBIANS AND REPTILES

English	Scientific	Dutch
Fire salamander	<i>Salamandra salamandra</i>	Vuursalamander
Golden-striped salamander	<i>Chioglossa lusitânica</i>	Goudstreepsalamander
Marbled newt	<i>Triturus marmoratus</i>	Marmersalamander
Bosca's newt	<i>Triturus boscai</i>	Spaanse watersalamander
Midwife toad	<i>Alytes obstetricans</i>	Vroedmeesterpad
Common toad	<i>Bufo bufo</i>	Gewone pad
Natterjack	<i>Bufo calamita</i>	Rugstreepad
Iberian frog	<i>Rana iberica</i>	Spaanse beekkikker
Perez's frog	<i>Rana perezii</i>	Iberische groene kikker
		Iberische meerkikker
Large psammodromus	<i>Psammodromus algirus</i>	Algerijnse zandloper
Ocellated lizard	<i>Lacerta lepida</i>	Parelhagedis
Schreiber's green lizard	<i>Lacerta schreiberi</i>	Spaanse smaragdhagedis
Iberian wall lizard	<i>Podarcis hispanica</i>	Spaanse muurhagedis
Bocage's wall lizard	<i>Podarcis bocagei</i>	Iberische muurhagedis
Tree-toed skink	<i>Chalcides chalcides</i>	Hazelskink
Montpellier snake	<i>Malpolon monspessulanus</i>	Hagedisslang
Ladder snake	<i>Elaphe scalaris</i>	Trapslang
Viperine snake	<i>Natrix maura</i>	Adderringslang
Grass snake	<i>Natrix natrix</i>	Ringslang
Smooth snake	<i>Coronella austriaca</i>	Gladde slang

APPENDIX I - BUTTERFLIES

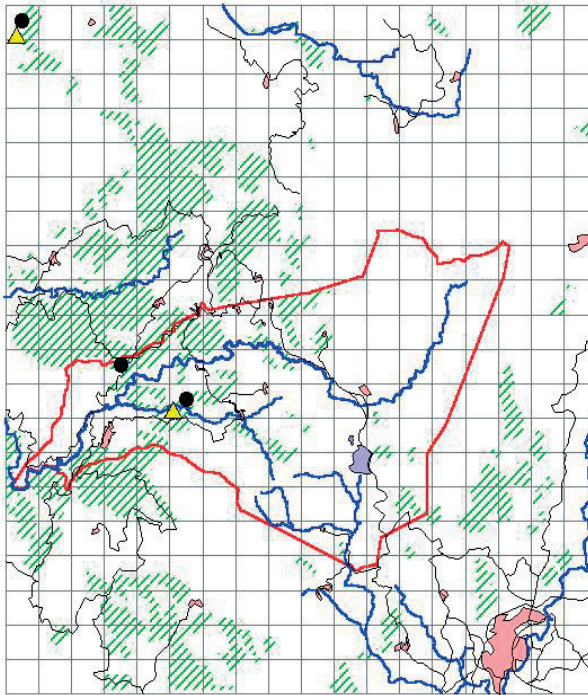
English	Scientific	Dutch
Dingy skipper	<i>Erynnis tages</i>	Bruin dikkopje
Red underwing skipper	<i>Spialia sertorius</i>	Kalkgraslanddikkopje
Large grizzled skipper	<i>Ochlodes venata</i>	Groot dikkopje
Mallow skipper	<i>Carcharodus alceae</i>	Kaasjeskruiddikkopje
Lulworth skipper	<i>Thymelicus acteon</i>	Dwergdikkopje
Essex skipper	<i>Thymelicus lineola</i>	Zwartsrietdikkopje
Small skipper	<i>Thymelicus sylvestris</i>	Geelsrietdikkopje
Silver-spotted skipper	<i>Hesperia comma</i>	Kommavlinder
Swallowtail	<i>Papilio machaon</i>	Koninginnepage
Scarce swallowtail	<i>Iphiclides podalirius</i>	Koningspage
Bath white	<i>Pontia daplidice</i>	Resedawitje
Wood white	<i>Leptidea sinapis</i>	Boswitje
Large white	<i>Pieris brassicae</i>	Groot koolwitje
Small white	<i>Pieris rapae</i>	Klein koolwitje
Green-veined white	<i>Pieris napi</i>	Klein geaderd witje
Clouded yellow	<i>Colias croceus</i>	Oranje luzernevlinder
Brimstone	<i>Gonepteryx rhamni</i>	Citroenvlinder
Blue-spot hairstreak	<i>Satyrium spini</i>	Wegedoornpage
False ilex hairstreak	<i>Satyrium esculi</i>	Spaanse eikenpage
Small copper	<i>Lycaena phlaeas</i>	Kleine vuurvlinder
Purple-shot copper	<i>Lycaena alciphron</i>	Violette vuurvlinder
Long's short-tailed blue	<i>Leptotes pirihous</i>	Klein tijgerblauwtje
Long-tailed blue	<i>Lampides boeticus</i>	Tijgerblauwtje
Holly blue	<i>Celastrina argiolus</i>	Boomblauwtje
Alcon blue	<i>Maculinea alcon</i>	Gentiaanblauwtje
Silver-studded blue	<i>Plebeius argus</i>	Heide blauwtje
Southern brown argus	<i>Aricia cramera</i>	Moors bruin blauwtje
Chapman's blue	<i>Polyommatus thersites</i>	Esparcetteblauwtje
Common blue	<i>Polyommatus icarus</i>	Icarusblauwtje
Adonis blue	<i>Polyommatus bellargus</i>	Adonisblauwtje
Lesser purple emperor	<i>Apatura ilia</i>	Kleine weerschijnvlinder
Camberwell beauty	<i>Nymphalis antiopa</i>	Rouwmantel
European peacock	<i>Inachis io</i>	Dagpauwoog
Painted lady	<i>Vanessa cardui</i>	Distelvlinder
Red admiral	<i>Vanessa atalanta</i>	Atalanta
Large tortoiseshell	<i>Nymphalis polychloros</i>	Grote vos
Small tortoiseshell	<i>Aglais urticae</i>	Kleine vos
Comma	<i>Polygonia c-album</i>	Gehakkelde aurelia
Silver-washed fritillary	<i>Argynnis paphia</i>	Keizersmantel
Niobe fritillary	<i>Argynnis niobe</i>	Duinparelmoervlinder
High brown fritillary	<i>Argynnis adippe</i>	Adippevlinder
Small pearl-bordered fritillary	<i>Boloria selene</i>	Zilveren maan
Knapweed fritillary	<i>Melitaea phoebe</i>	Knoopkruidparelmoervlinder

Provençal fritillary	Melitaea deione	Provençaalse parelmoervlinder
Spanish marbled white	Melanargia lachesis	Spaans dambordje
Esper's marbled White	Melanargia russiae	Zuidelijk dambordje
Rock grayling	Hipparchia alcyone	Kleine boswachter
Grayling	Hipparchia semele	Heivlinder
Striped grayling	Hipparchia fidia	Gestreepte heivlinder
Great banded grayling	Brintesia circe	Witbandzandoog
Meadow brown	Maniola jurtina	Bruine zandoog
Dusky meadow brown	Hyponephele lycaon	Grauwe zandoog
Gatekeeper (Hedge brown)	Pyronia tithonus	Oranje zandoog
Southern gatekeeper	Pyronia cecilia	Zuidelijk oranje zandoog
Dusky heath	Coenonympha dorus	Bleek hooibeestje
Small heath	Coenonympha pamphilus	Hooibeestje
Speckled wood	Pararge aegeria	Bont zandoogje
Wall brown	Lasiommata megera	Argusvlinder
Large wall brown	Lasiommata maera	Rotsvlinder
Emperor Moth	Saturnia pavonia	Grote nachtpauwoog
Jersey tiger	Euplagia quadripunctaria	Spaanse vlag
Oak egger	Lasiocampa quercus	Eikenspanner

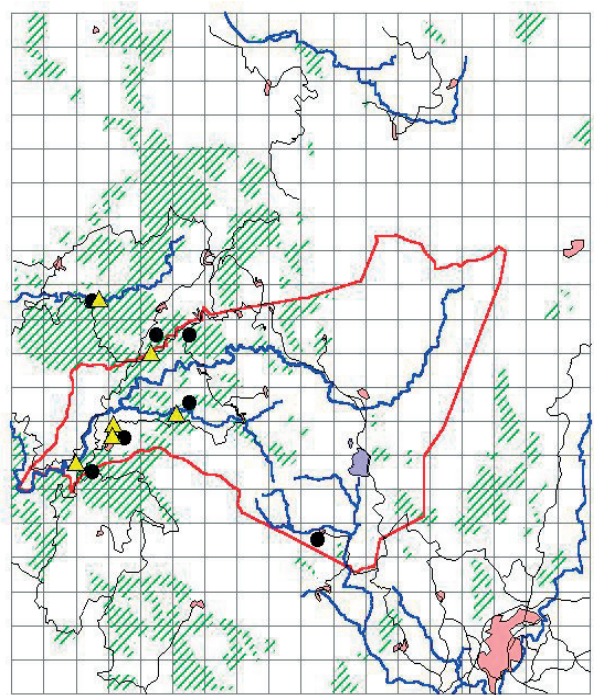
APPENDIX J – DRAGONFLIES

English	Scientific	Dutch
	Calopteryx xanthostoma	Iberische beekjuffer
Beautiful demoiselle	Calopteryx virgo	Bosbeekjuffer
	Calopteryx haemorrhoidalis	Koperen beekjuffer
	Lestes virens vestalis	Tengere pantserjuffer
Scarce blue-tailed damselfly	Ischnura pumilio	Tengere grasjuffer
Common blue damselfly	Enallagma cyathigerum	Watersnuffel
Large red damselfly	Pyrrhosoma nymphula	Vuurjuffer
Small red damselfly	Cerciagrion tenellum	Koraaljuffer
	Platycnemis latipes	Witte breedscheenjuffer
Southern hawkler	Aeshna cyaena	Blauwe glazenmaker
Norfolk hawkler	Aeshna isosceles	Vroege glazenmaker
	Boyeria irene	Schemerlibel
Emperor dragonfly	Anax imperator	Grote keizerlibel
	Onychogomphus uncatus	Grote tanglibel
Golden-ringed dragonfly	Cordulegaster bontonii immaculifrons	Gewone bronlibel
Orange-spotted emerald	Oxygastra curtisii	Bronslibel
Four-spotted chaser	Libellula quadrimaculata	Viervlek
Keeled skimmer	Orthetrum coerulescens	Beekoeverlibel
Southern skimmer	Orthetrum brunneum	Zuidelijke oeverlibel
Scarlet dragonfly	Crocothemis erythraea	Vuurlibel
Ruddy darter	Sympetrum sanguineum	Bloedrode heidelibel
Red-veined darter	Sympetrum fonscolombii	Zwervende heidelibel

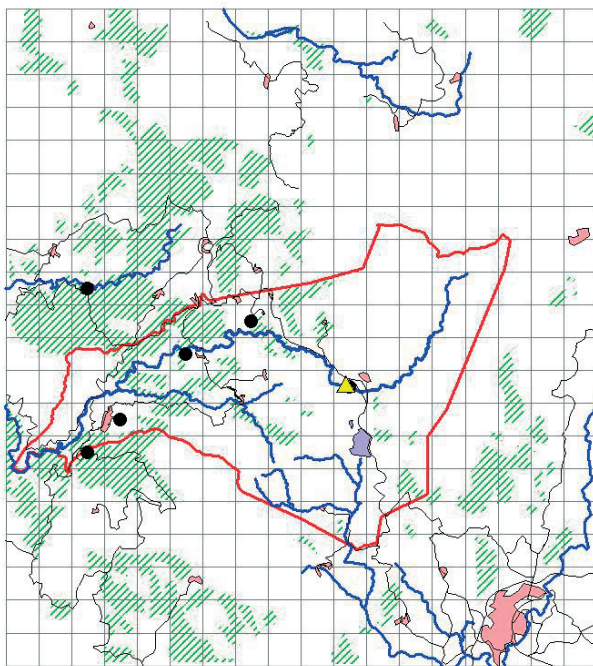
BATS



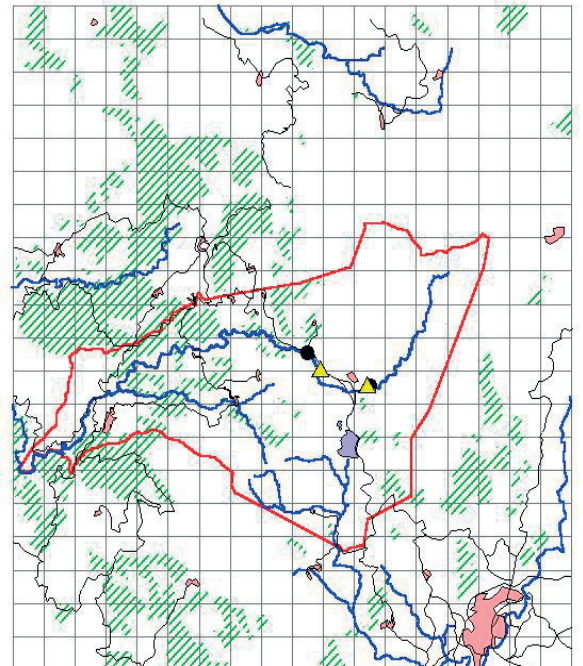
Rhinolophus ferrumequinum



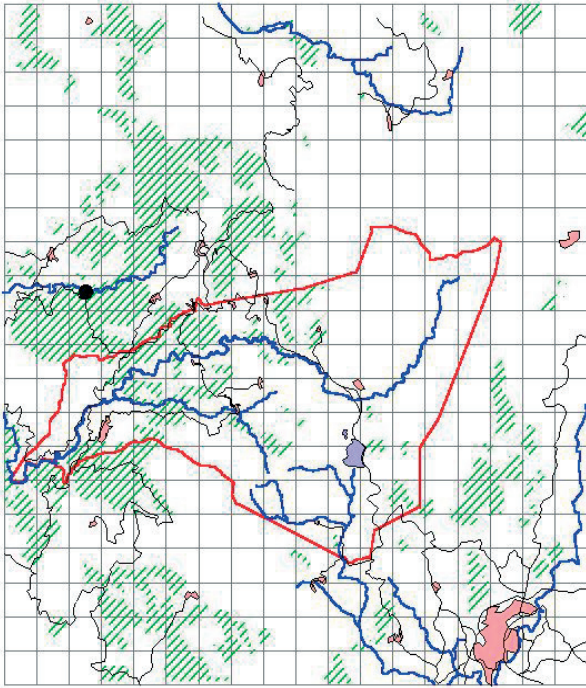
Rhinolophus hipposideros



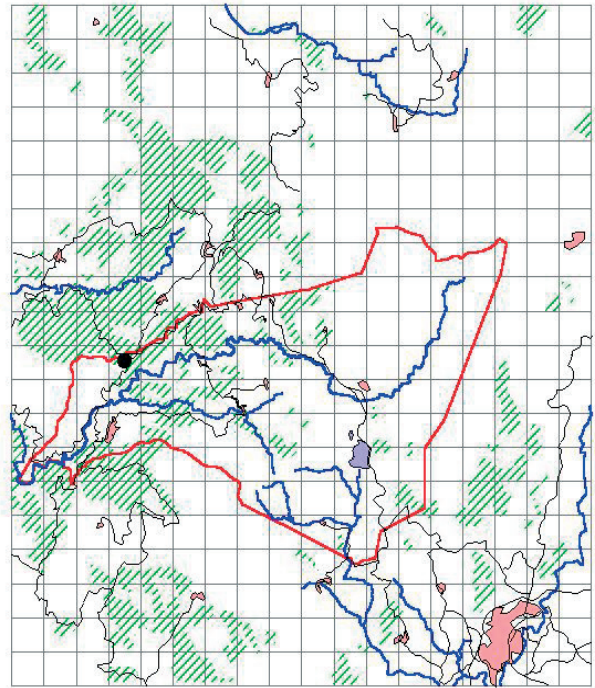
Myotis daubentonii



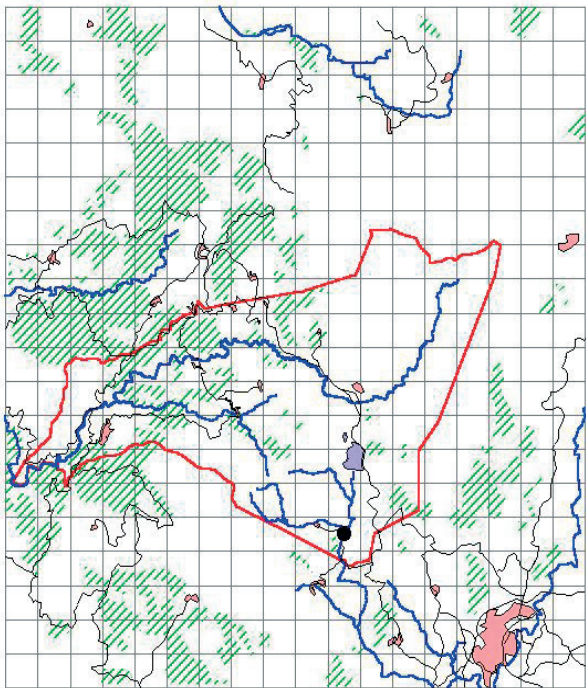
Myotis mystacinus



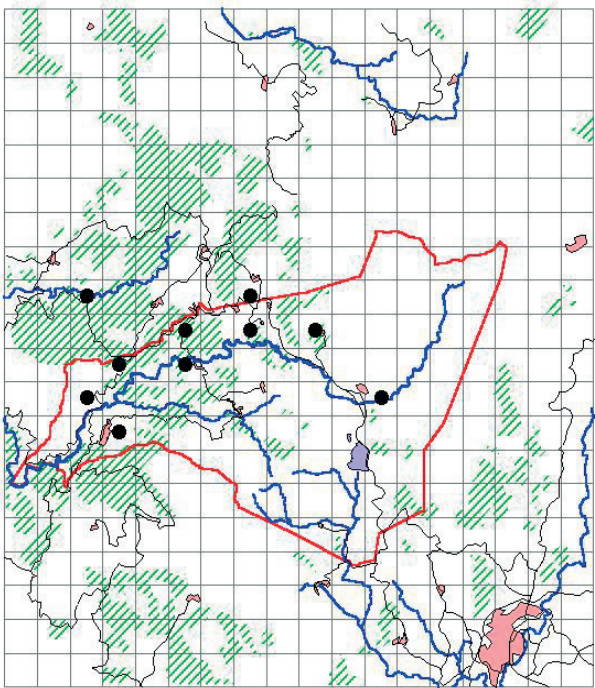
Myotis emarginatus



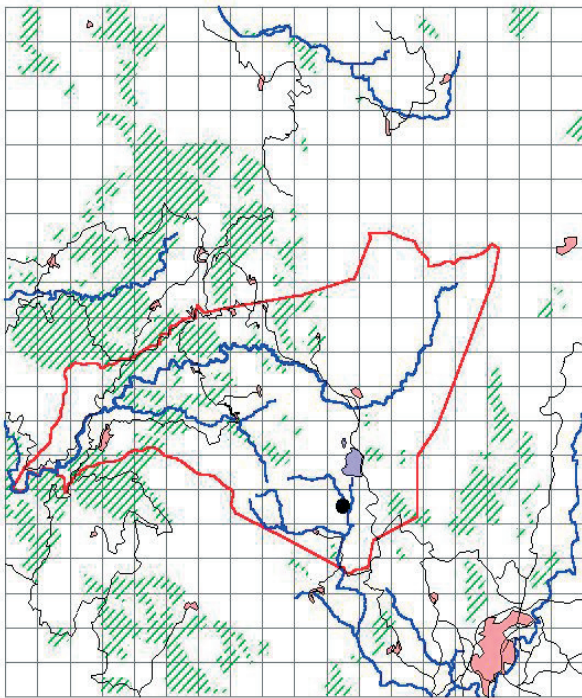
Myotis nattereri



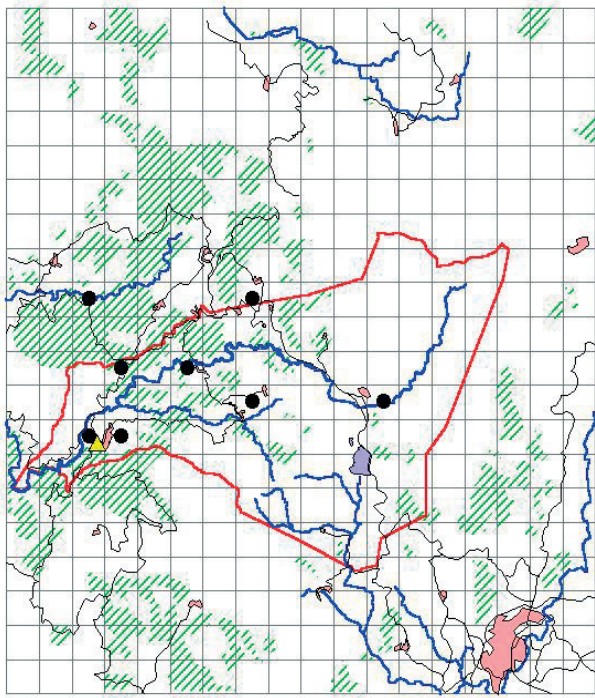
Myotis spec.



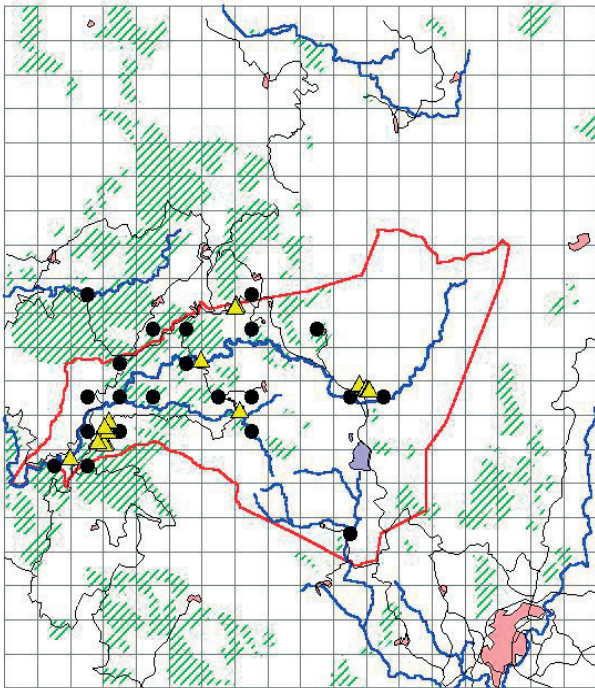
Nyctalus leisleri



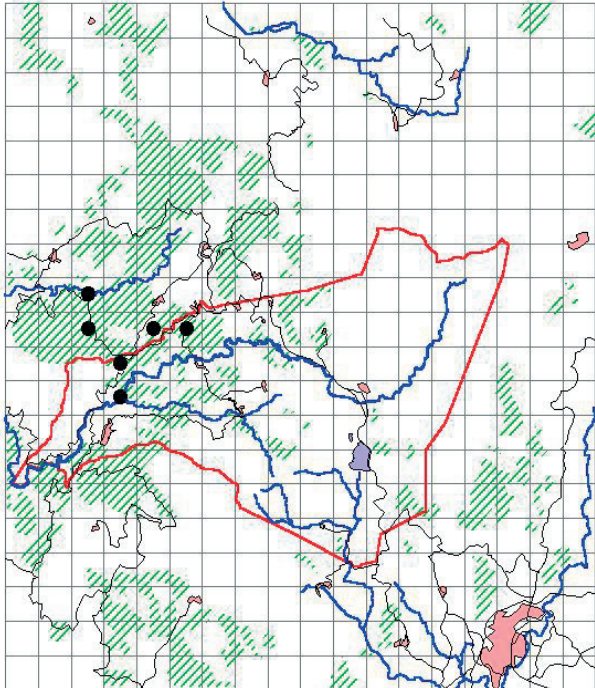
Nyctalus spec.



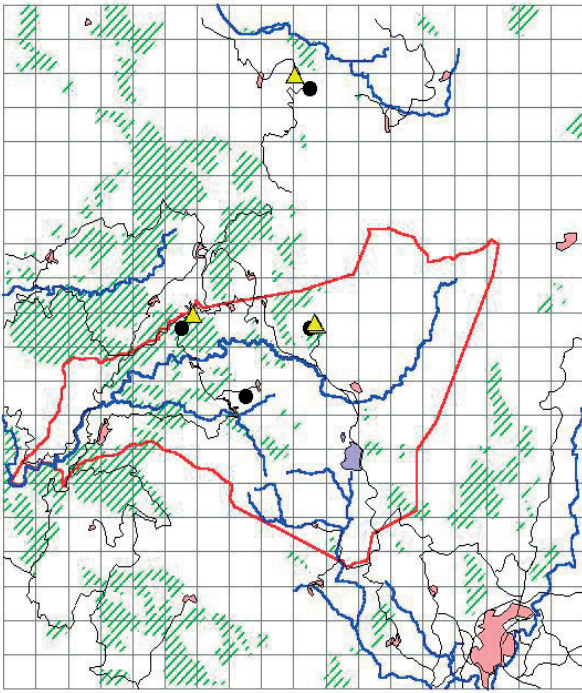
Eptesicus serotinus



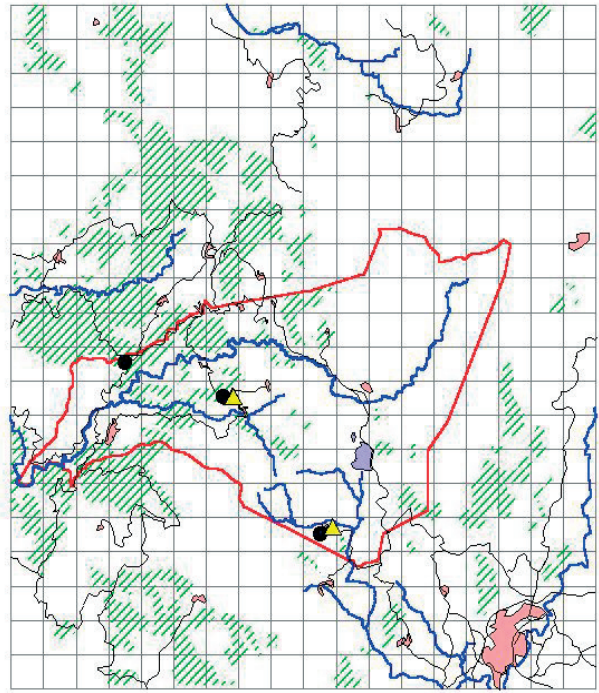
Pipistrellus pipistrellus



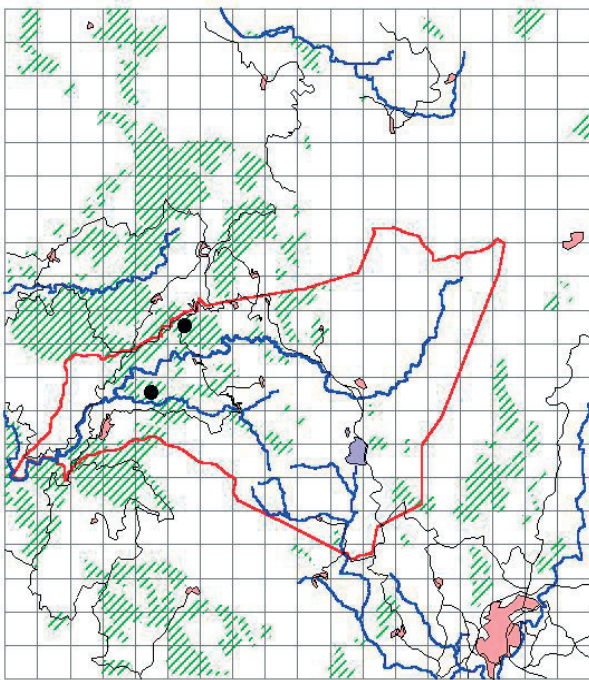
Pipistrellus kuhlii



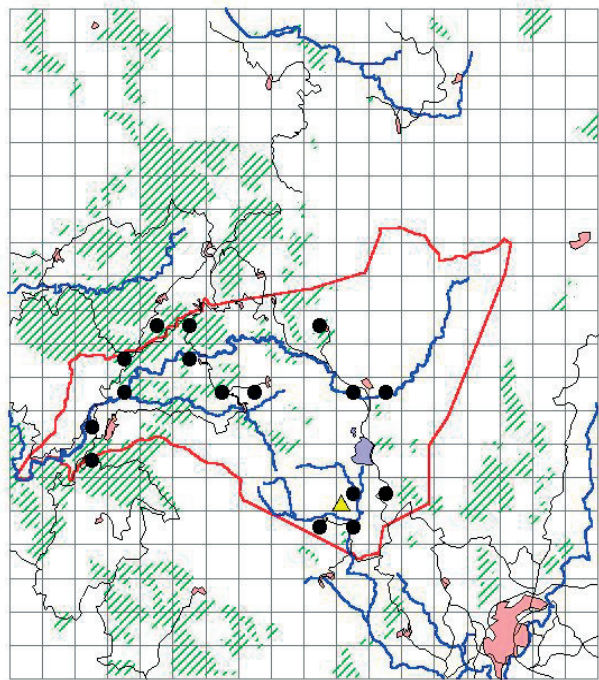
Plecotus auritus



Plecotus austriacus

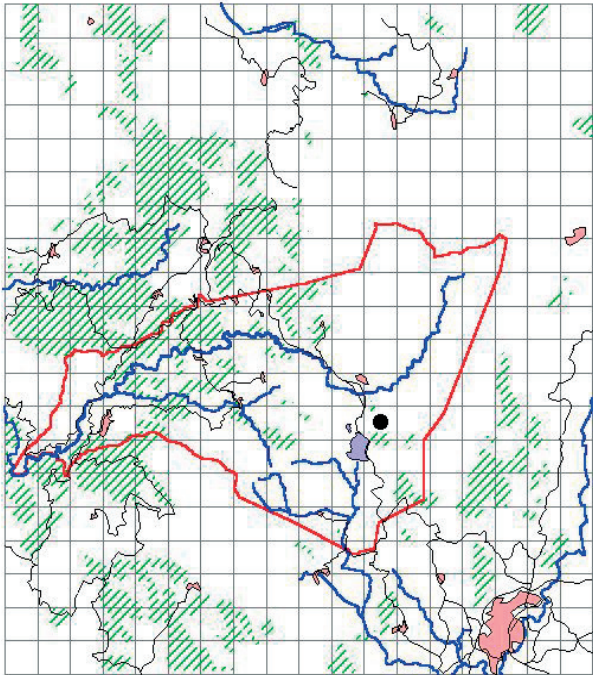


Barbastella barbastellus

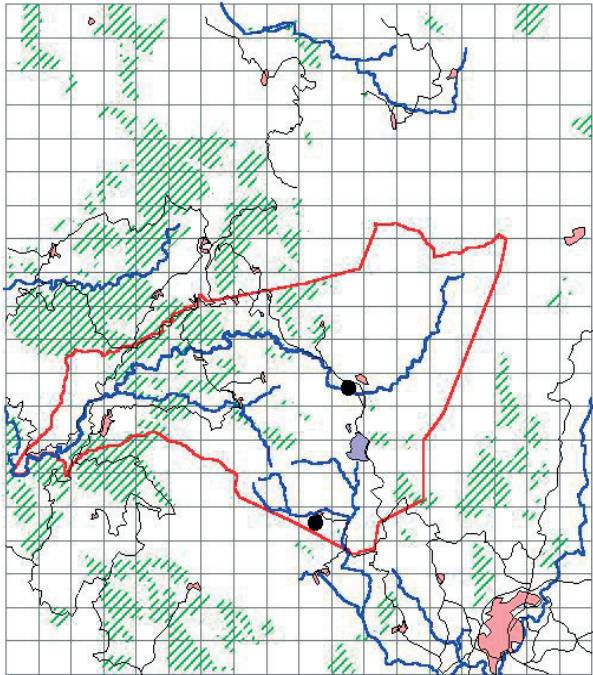


Tadarida teniotis

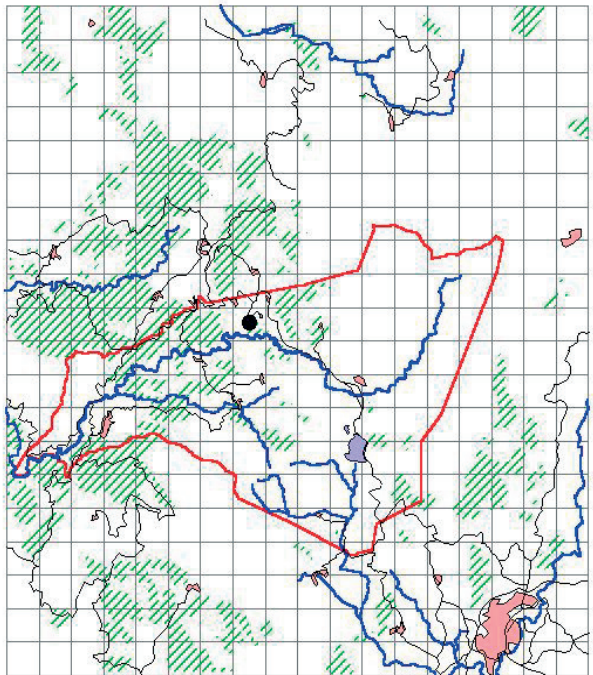
SHREWS AND MICE



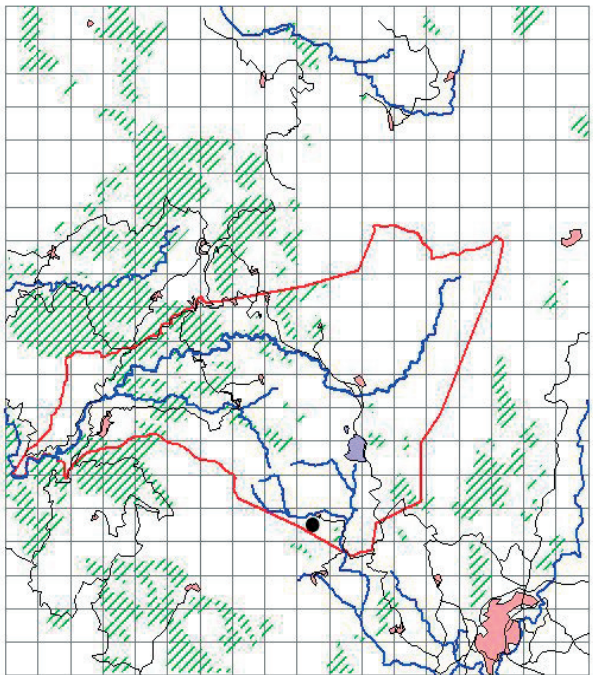
Crocidura russula



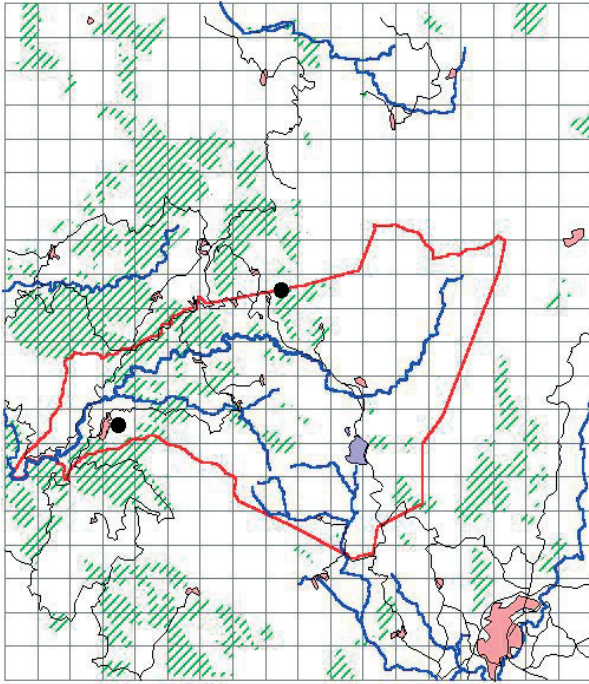
Arvicola sapidus



Microtus lusitanicus

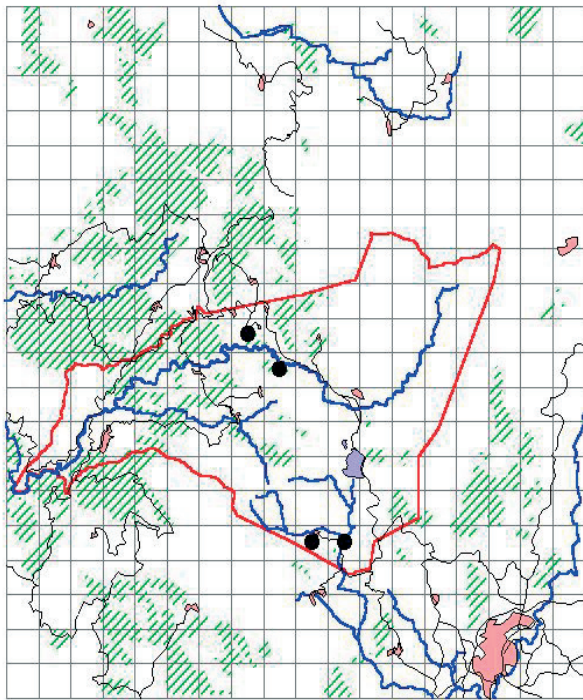


Apodemus sylvaticus

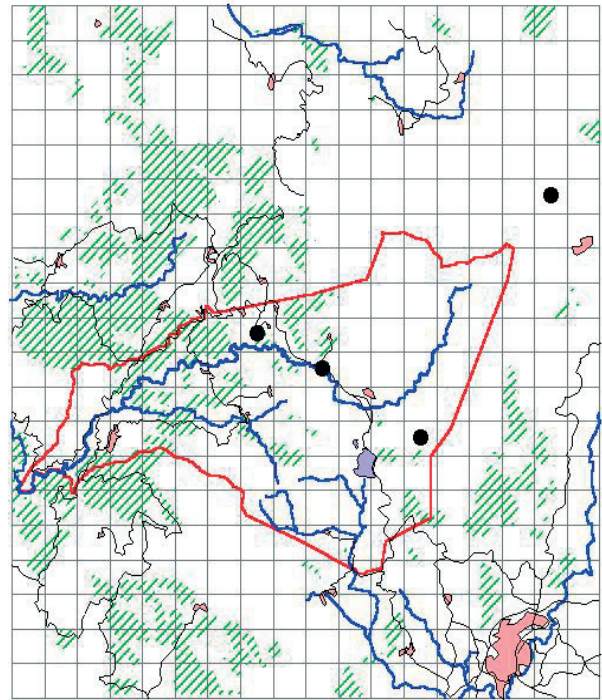


Rattus rattus

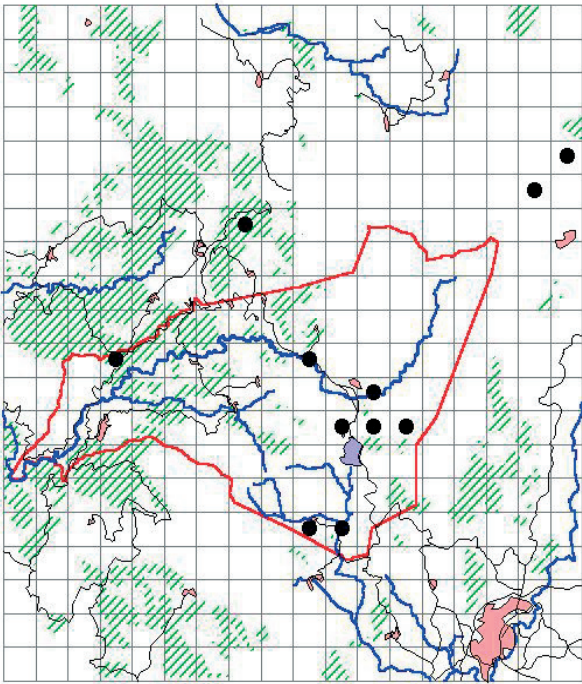
OTHER MAMMALS



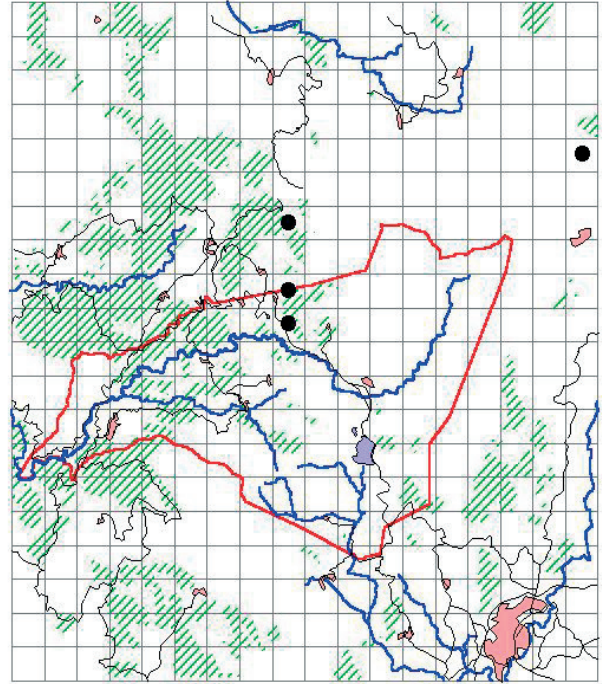
Galemys pyrenaicus



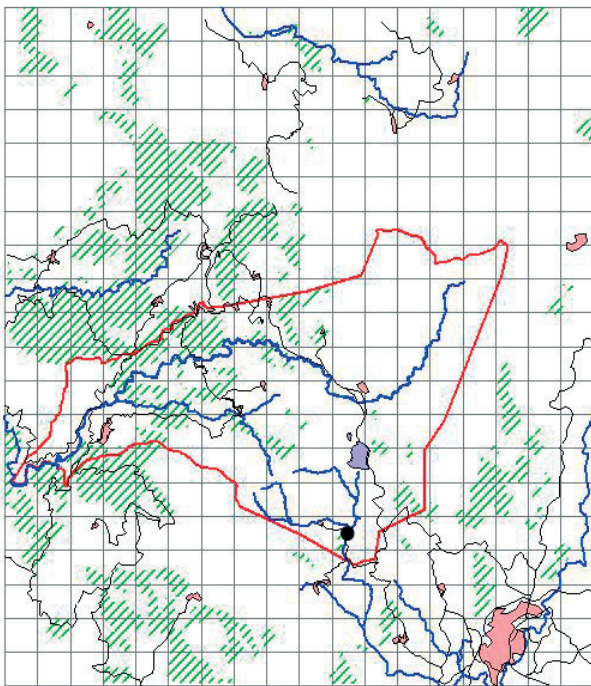
Talpa occidentalis



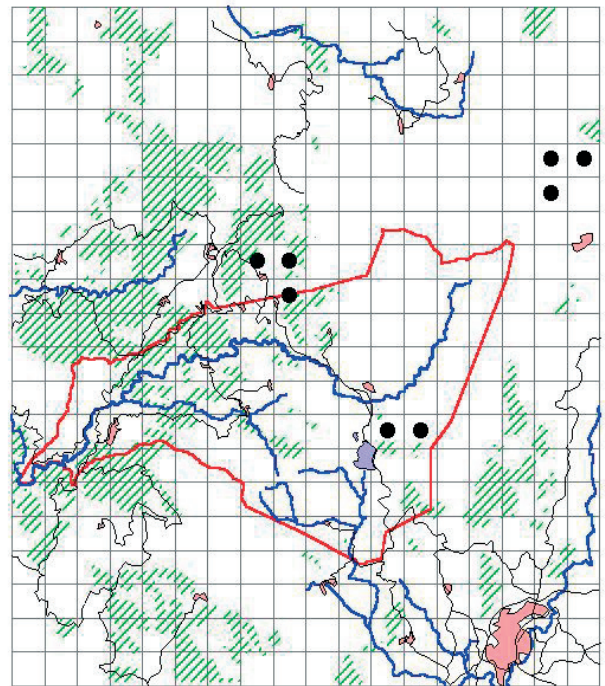
Oxytolagus cuniculus



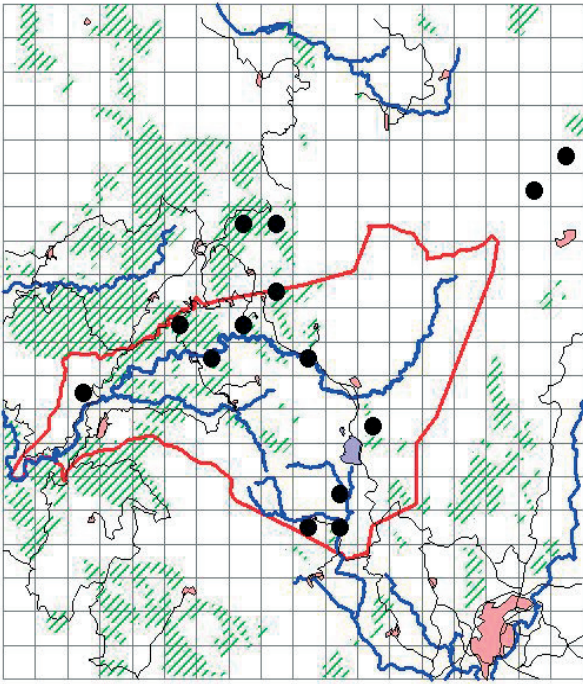
Sciurus vulgaris



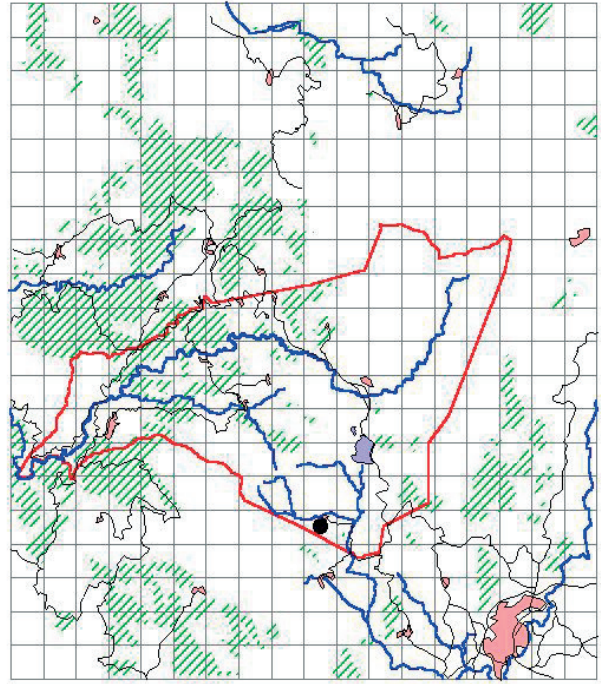
Eliomys quercinus



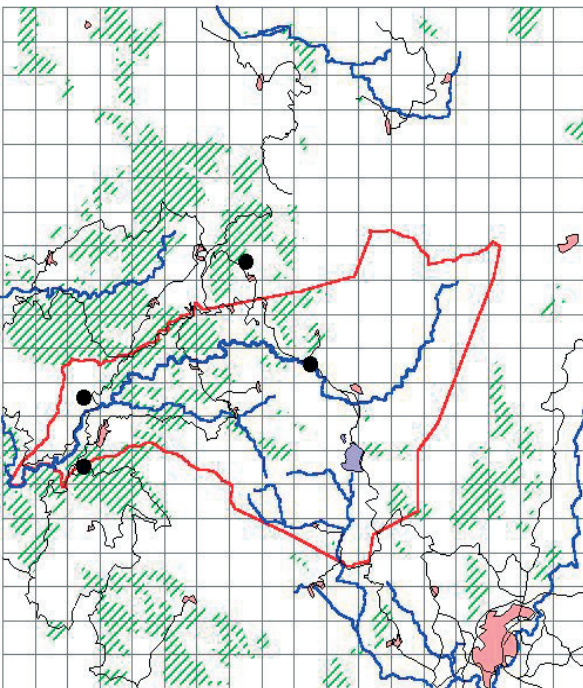
Canis lupus



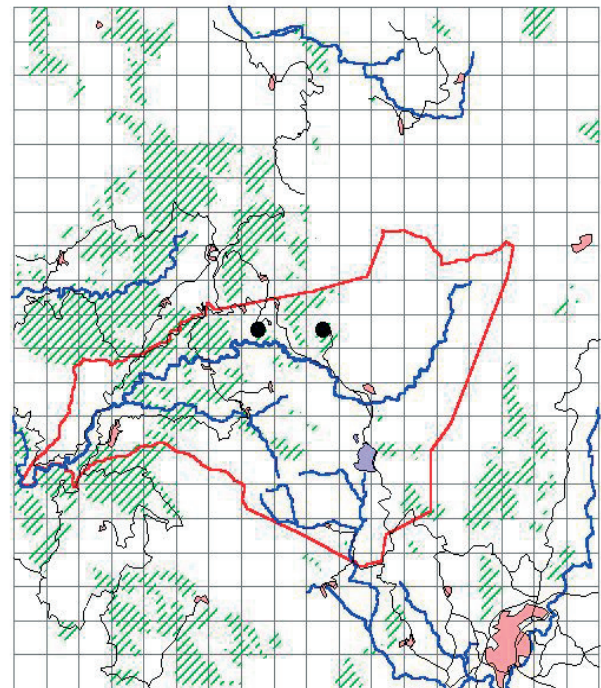
Vulpus vulpus



Mustela nivalis



Lutra lutra



Sus scrofa

BIRDS



Circus pygargus



Accipiter nisus



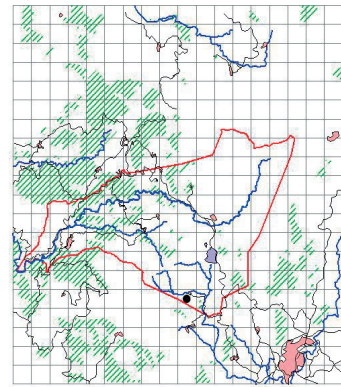
Accipiter gentilis



Pernis apivorus



Buteo buteo



Aquila chrysaetos



Hieraaetus fasciatus



Circaetus gallicus

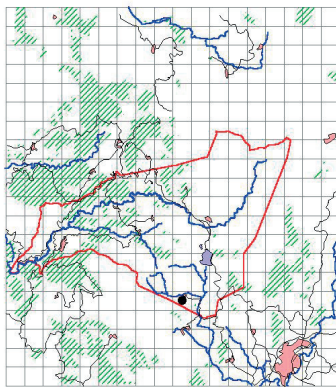
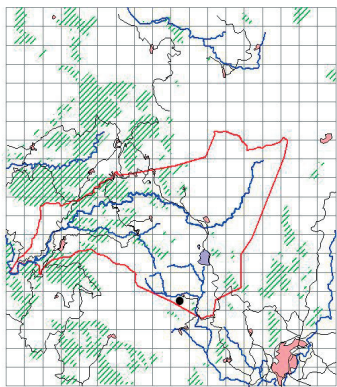


Hieraaetus pennatus

Falco tinnunculus

Falco peregrinus

Actitis hypoleucos





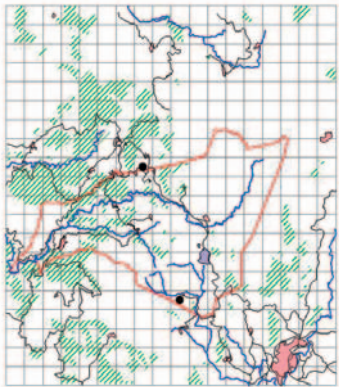
Streptopelia turtur



Tyto alba



Strix aluco



Athene noctua



Caprimulgus europaeus



Alcedo atthis



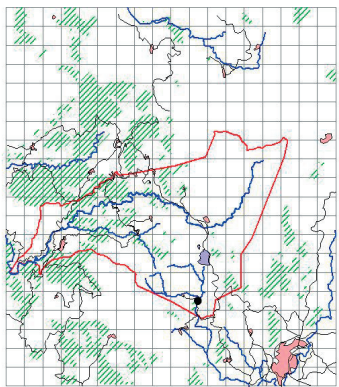
Upupa epops



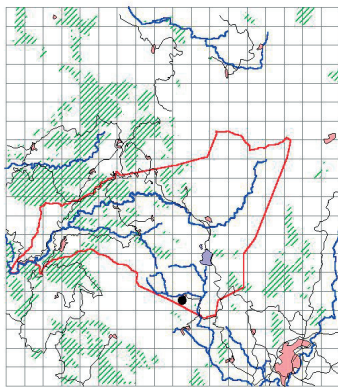
Cinclus cinclus



Picus viridis



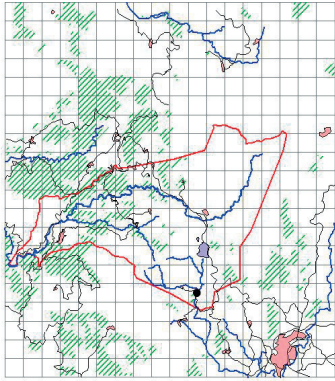
Alauda arvensis



Lullula arborea



Ptyonoprogne rupestris



Hirundo daurica



Delichon urbica



Motacilla cinerea



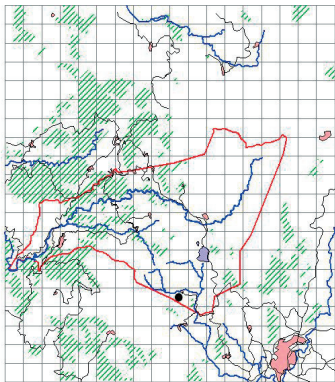
Motacilla flava iberiae



Phoenicurus ochrurus



Saxicola torquata



Sylvia undata



Phylloscopus bonelli



Phylloscopus ibericus



Ficedula hypoleuca



Muscicapa striata



Parus cristatus



Parus caeruleus



Parus major



Parus ater



Aegithalos caudatus



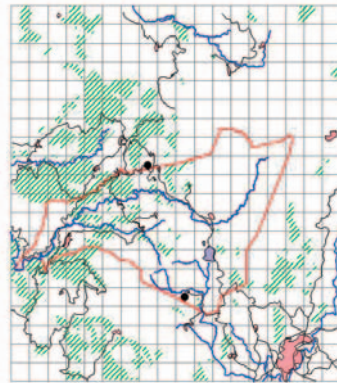
Sitta europea



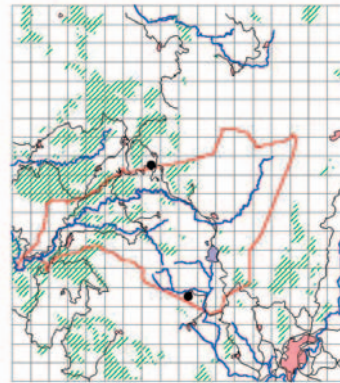
Certhia brachydactyla



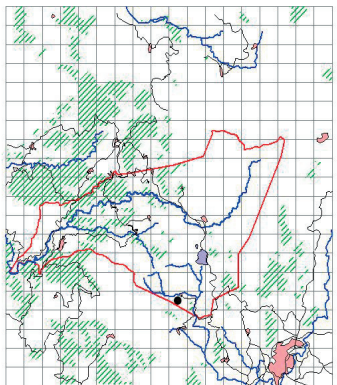
Lanius excubitor



Oriolus oriolus



Pyrrhonorax pyrrhonorax



Corvus corax



Corvus corone



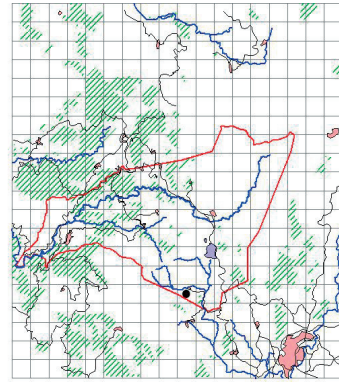
Pyrrhula pyrrhula



Coccythraustes coccythraustes



Carduelis carduelis



Carduelis cannabina

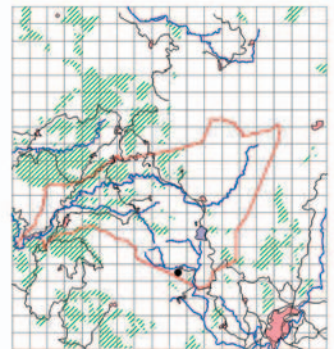


Miliaria calandra



Emberiza cia

AMPHIBIANS AND REPTILES



Salamandra salamandra



Chioglossa lusitanica



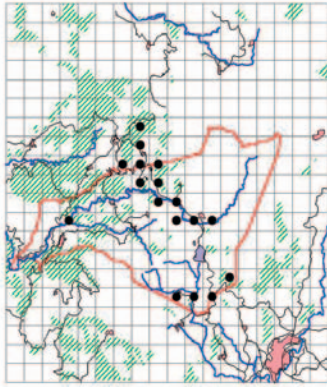
Triturus marmoratus

Triturus boscai

Alytes obstetricans

Bufo bufo





Rana iberica



Rana perezi



Psammodromus algirus



Lacerta lepida



Lacerta schreiberi



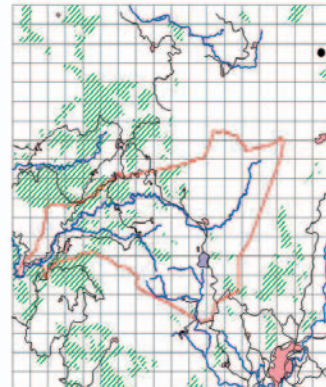
Podarcis hispanica



Podarcis bocagei



Chalcides chalcides



Malpolon monspessulanus



Elaphe scalaris



Natrix maura



Natrix natrix

BUTTERFLIES



Erynnis tages



Spialia sertorius



Ochloides venata



Carcharodus alceae



Thymelicus acteon



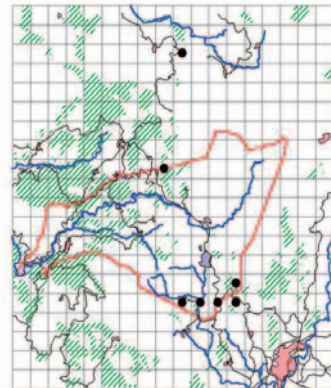
Thymelicus lineola



Thymelicus sylvestris



Hesperia comma



Iphiclides podalirius



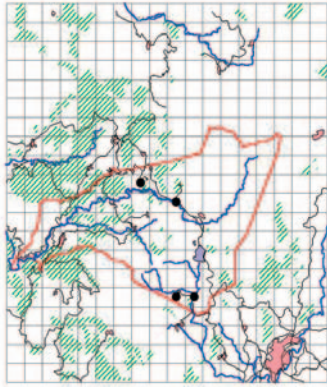
Pontia daplidice



Leptidea sinapis



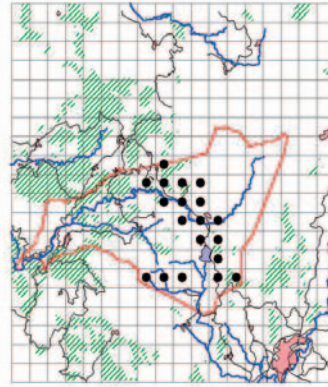
Pieris brassicae



Pieris rapae



Pieris napi



Colias croceus



Gonepteryx rhamni



Satyrium spini



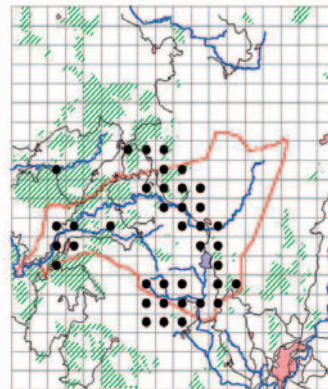
Satyrium esculi



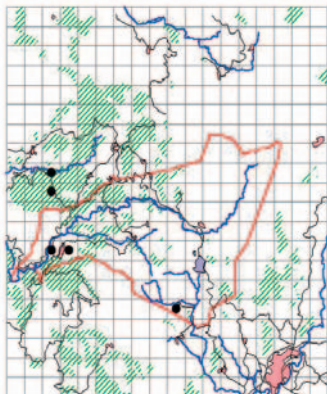
Lycaena phlaeas



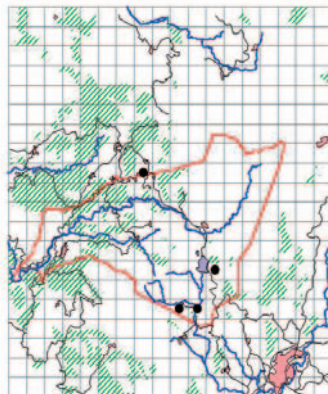
Lycaena alciphron



Leptotes pirihous



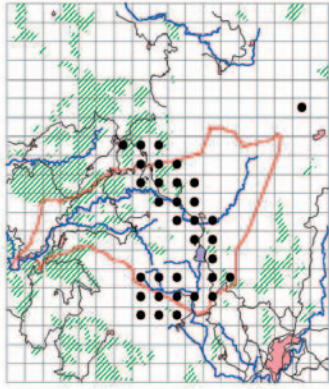
Lampides boeticus



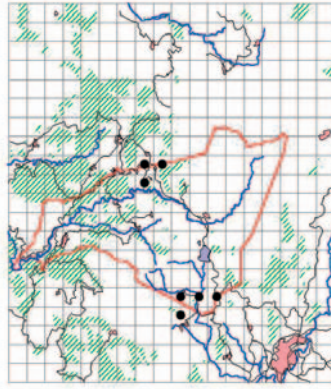
Celastrina argiolus



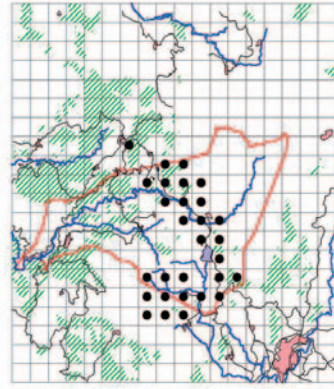
Maculinea alcon



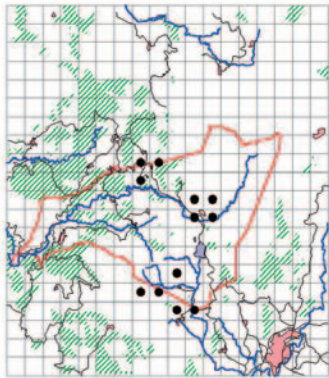
Plebeius argus



Aricia cramera



Polyommatus icarus



Polyommatus bellargus



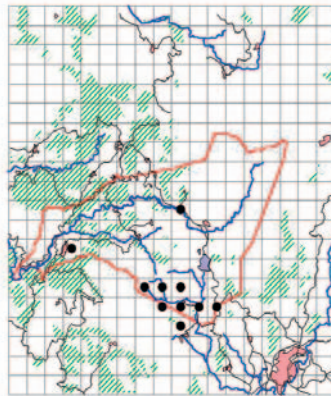
Apatura ilia



Nymphalis antiopa



Inachis io



Vanessa cardui



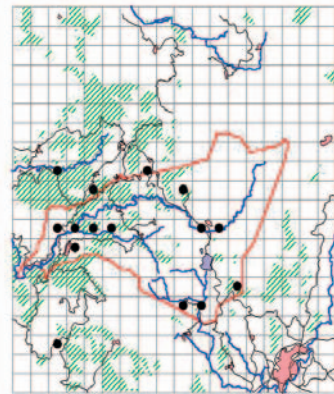
Nymphalis polychloros



Aglais urticae



Polygonia c-album



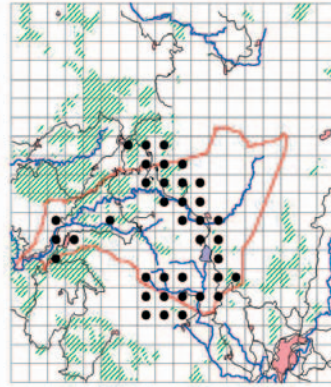
Argynnis niobe



Melitaea phoebe



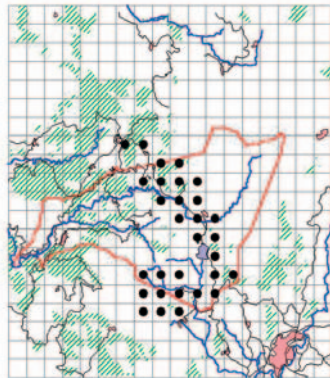
Melitaea deione



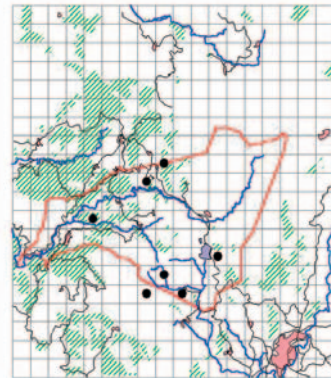
Melanargia lachesis



Melanargia russiae



Hipparchia alcyone



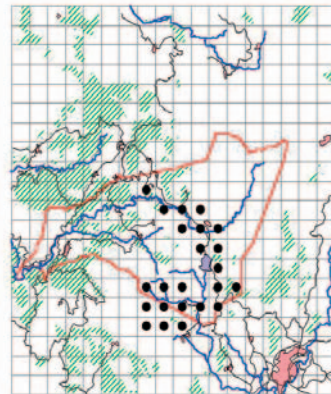
Hipparchia semele



Hipparchia fidia



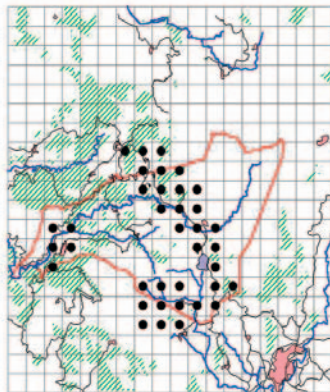
Brintesia circe



Maniola jurtina



Hyponephele lycaon



Pyronia tithonus



Coenonympha dorus



Coenonympha pamphilus



Pararge aegeria



Lasiommata megera



Lasiommata maera



Saturnia pavonia



Euplagia quadripunctaria

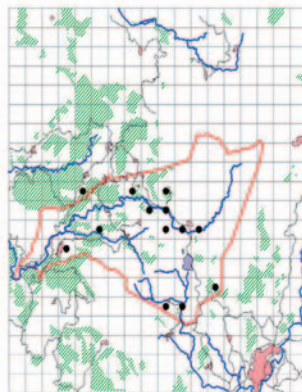


Lasiocampa quercus

DRAGONFLIES



Calopteryx xanthostoma



Calopteryx virgo



Calopteryx haemorrhoidalis



Pyrrhosoma nymphula



Platynemesis latipes



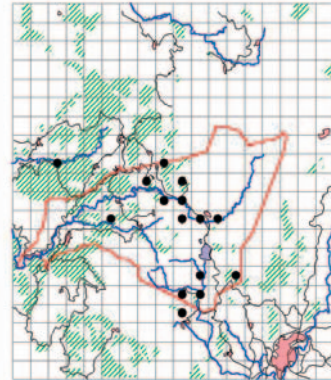
Aeshnea isosceles



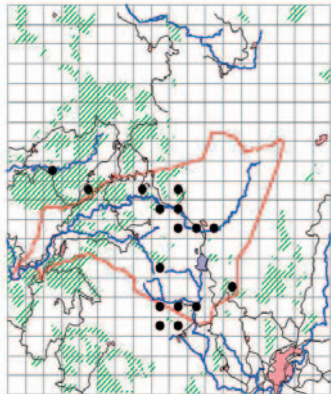
Boyeria irene



Anax imperator



Onychogomphus uncatus



Cordulegaster bontonii immaculifrons



Oxygastra curtisii



Orthetrum coerulescens



Orthetrum brunneum



Crocothemis erythraea



Sympetrum sanguineum