

**THE DADIA–LEFKIMI–SOUFLI FOREST NATIONAL PARK, GREECE:  
BIODIVERSITY, MANAGEMENT AND CONSERVATION**

Edited by  
*Giorgos Catsadorakis and Hans Källander*

Illustrations by  
*Paschalis Dougalis*



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*Editors:*

Giorgos Catsadorakis,  
P.O. Box 403,  
Dadia,  
GR-68 400 Soufli,  
GREECE  
doncats@otenet.gr  
g.catsadorakis@wwf.gr

Hans Källander,  
Villavägen 6,  
SE-240 35 Harlösa,  
SWEDEN

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# The mammalian fauna: an annotated list

Giorgos Catsadorakis and Dimitris Bousbouras

Excluding bats, 30 mammalian species have been recorded with certainty in the DNP, while ten more may be present. Of the former, the status of three is uncertain, and three are only accidental in the park. All rodents, insectivores and mustelids are very poorly known. Three species are of Anatolian origin. European Lynx *Lynx lynx* and European Souselik *Citellus citellus* are considered extinct. Biogeographically, the record of *Suncus etruscus* is of interest. The preservation and further diversification of the present landscape mosaic and the preservation of natural hedges along the cultivated fields are crucial for most small mammals. The main threats to large terrestrial mammals come from poisoned baits (Wolf *Canis lupus*, Golden Jackal *Canis aureus*), poaching (Roe Deer *Capreolus capreolus*) and overhunting (Brown Hare *Lepus europaeus*, Wild Boar *Sus scrofa*), while the few Eurasian Otters *Lutra lutra* are potentially threatened by food scarcity because of the construction of small dams on streams, the creation of dikes and removal of stream vegetation. Badgers *Meles meles*, Red Foxes *Vulpes vulpes*, Beech Martens *Martes foina* and hedgehogs suffer from heavy traffic mortality on asphalt roads.

**Keywords:** Mammals, Greece, Dadia National Park, faunistics, mammal conservation, Balkan mammals

## Introduction

To date, there has been no systematic study on the mammalian fauna of the Dadia–Lefkimi–Soufli National Park (DNP) with the exception of a study of bats (see Papadatou, this volume) and a short study of woodmice *Apodemus* spp. (Bousbouras 1999). Ondrias (1966), in his review of rodents of Greece, had no sample from the area (the closest sampling locality was Kallithea, a few km outside the park), nor did Vohralík and Sofianidou (1992) include DNP as a sampling locality in their study of the mammals of Thrace (the closest locality was Mikro Dereio). The first effort to gather and review the data available on the mammals of the area took place in the early 1990s within the framework of the Specific Environmental Study for the designation of the area as a National Park (Adamakopoulos et al. 1995). At that time Bousbouras et al. (unpublished) had attempted to trap rodents and insectivores during a short period of time; they also attempted to collate various published

data obtained through analysis of pellet and nest contents of nocturnal and diurnal birds of prey as well as unpublished information provided by several researchers and local people. Despite that effort, the importance of small and medium-sized mammals as potential prey of the park's raptorial birds and their contribution to the diets of the raptors remain largely unknown, since the bulk of the so far collected evidence is circumstantial.

In the present paper we review all published and unpublished information on the mammalian fauna of the DNP, with the exception of bats which are presented elsewhere in this book (Papadatou, this volume). The data are compared with those gathered in neighbouring parts of Bulgaria and the Eastern Rhodopes, which have been slightly better studied (Minkova 2004, Spassov and Markov 2004). Nomenclature and species sequence follow Mitchell-Jones et al. (1999) but the important changes made recently (Wilson and Reeder 2005) are also indicated when proper. A full list of species and their conservation status are shown in Table 1.

## The insectivores

Regular and abundant visual observations of Eastern Hedgehog *Erinaceus concolor* (*Erinaceus roumanicus* according to Wilson and Reeder 2005) provide evidence for a wide distribution all over the park. Remains were also found in a nest of Egyptian Vulture *Neophron percnopterus*, and the species was also recorded as prey of Lesser Spotted Eagle *Aquila pomarina* (Vlachos 1989), Imperial Eagle *Aquila heliaca* (A. Wittgen, in Adamakopoulos et al. 1995), and Long-legged Buzzard *Buteo rufinus* (Alivizatos 1996). Eastern Hedgehog is a species widely distributed in Thrace (Vohralík and Sofianidou 1992).

Dead moles (*Talpa* sp.) and mole hills have been found in many places in the park, admittedly in very low densities despite the quite large expanses of pastures and fields with deep soils. No taxonomic studies have been made so far and the observed animals have only been identified to genus. The species most likely to be found in Thrace is *Talpa europaea* (Vohralík and Sofianidou 1992, Mitchell-Jones et al. 1999, Kryštufek and Vohralík 2001), which is also the species whose range extends all over Turkish Thrace (Kryštufek and Vohralík 2001). All species of the genus are classified as Insufficiently Known in the Red Data Book for the Vertebrates of Greece (Karandinos and Legakis 1992). In the DNP, remains of *Talpa* sp. have been found in pellets of Imperial Eagle (A. Wittgen, in Adamakopoulos et al. 1995).

One adult Pygmy White-toothed Shrew *Suncus etruscus* was caught by G. Catsadorakis in November 2004 at the outskirts of Dadia village. This is one of the less studied and less well known species of the Greek mammalian fauna, and DNP is one of the few sites in Greece where the species has been recorded. In fact, the captured individual represents the second record for the Greek and Bulgarian part of Thrace as Vohralík and Sofianidou (2000) found two specimens in Barn Owl *Tyto alba* pellets collected at the outskirts of the town of Didymoteicho in 1994. Minkova (2004) stated that this shrew was found in many raptor pellets in the Sakar Mountains. However, it was neither captured live nor were specimens ensured otherwise. Various authors have proposed specific isotherms as indicative of the range border of the species as for example the average annual isotherm of 12° C, the January isotherm of 0° C or the July isotherm of 20° C (Popov and Nijagolov 1991 in Minkova 2004, Vohralík and Sofianidou 2000, Kryštufek 2003). Although apparently a lowland species (found generally below 1000 m asl), its actual range is still too poorly explored to give definite answers to this

issue. However, DNP has an annual mean temperature of 14.3° C (Maris and Vasileiou 2009) and is c. 40 km from the sea coast.

Remains of *Crocidura* spp. have been found in pellets of Eagle Owl *Bubo bubo* (D. Bousbouras, in Adamakopoulos et al. 1995). Bi-coloured White-toothed Shrew *Crocidura leucodon* was captured in 1994 (Bousbouras 1999). Both *Crocidura leucodon* and Lesser White-toothed Shrew *C. suaveolens* might be present in the DNP. The latter species is considered by Vohralík and Sofianidou (1992) to be the most common shrew in Thrace. Finally, Adamakopoulos et al. (1995) mention that the Water Shrew *Neomys fodiens* was observed by Helmer and Scholte (1985), but we have been unable to locate any such record in their report. Also, according to the maps in Mitchell-Jones et al. (1999), it is much less likely to occur in this area than Miller's Water Shrew *Neomys anomalus*.

## The lagomorphs and rodents

The Brown Hare *Lepus europaeus* is a species with a wide distribution all over the park. Repeated releases of captive-bred animals of unknown origin have been made by the hunters' clubs. Every year at least 60–80 hares are killed by the hunters of Dadia village alone. It has been found in pellets of Golden Eagle *Aquila chrysaetos* and Imperial Eagle (A. Wittgen, in Adamakopoulos et al. 1995) and Lesser Spotted Eagle (Vlachos, in Adamakopoulos et al. 1995).

The Red Squirrel *Sciurus vulgaris* is distributed all over the park, but the population seems to be sparse. The species was considered as a pest up to the 1960s and the state paid bounty for proved killings. The European Sousek *Spermophilus citellus* was formerly widespread in the park (Helmer and Scholte 1985, K. Pistolas, pers. comm.). Colonies at Mangazi, close to Dadia, were exterminated in the 1970s. The last known colony within the park, in the agricultural zone of Lyra, was destroyed unintentionally in 1992 by heavy machinery removing soil and it seems the species failed to re-establish in the area. It had been found in pellets of Golden Eagle (A. Wittgen, in Adamakopoulos et al. 1995), Lesser Spotted Eagle (Vlachos 1989, A. Wittgen, in Adamakopoulos et al. 1995), Imperial Eagle (A. Wittgen, in Adamakopoulos et al. 1995) and Long-legged Buzzard (Ch. Alivizatos, pers. comm.). Vohralík and Sofianidou (1992) observed it around Fylakto in June 1991.

Among dormice, the Forest Dormouse *Dryomys nitedula* and the Fat Dormouse *Glis glis* have been re-

Table 1. Non-volant mammal species recorded within Dadia–Lefkimi–Soufli National Park (various sources) and conservation status. Presence status: R=resident; ?= uncertain presence; IUCN (2007): VU=Vulnerable, LR/nt=Low Risk/near threatened, NT=Near Threatened; 92/43: II=Annex II of EU Directive 92/43, II\*=Priority Species; Red Book: Red Data Book of the Threatened Vertebrates of Greece (1992) : K=Insufficiently known, V=Vulnerable, R=Rare, (V)=Possibly Vulnerable, E=Endangered, (E)=Possibly Endangered.

	SPECIES	Presence status	IUCN	92/43	Red Book
1	<i>Erinaceus concolor</i> ( <i>Erinaceus roumanicus</i> in Wilson and Reeder 2005)	R			
2	<i>N. anomalus</i>	?			
3	<i>Crocidura leucodon</i>	R			
4	<i>Crocidura suaveolens</i>	?			
5	<i>Suncus etruscus</i>	R			
6	<i>Talpa europaea</i>	R			K
7	<i>Lepus europaeus</i>	R			
8	<i>Sciurus vulgaris</i>	R			
9	<i>Spermophilus citellus</i>	EXTINCT	VU	II	V
10	<i>Cricetulus migratorius</i>	? / Only in pellets	LR/nt		E
11	<i>Clethrionomys glareolus</i> ( <i>Myodes glareolus</i> in Wilson and Reeder 2005)	? / Only in pellets			
12	<i>Arvicola terrestris</i>	? / Only in pellets			
13	<i>Microtus rossiaemeridionalis</i> ( <i>M. levis</i> in Wilson and Reeder 2005) or/and <i>M. guentheri</i>	R/uncertain taxon	LR/nt		
14	<i>Apodemus flavicollis</i>	R			
15	<i>Apodemus sylvaticus</i>	R			
16	<i>Rattus rattus</i>	R			
17	<i>Mus musculus</i> / <i>domesticus</i> ( <i>M. musculus domesticus</i> in Wilson and Reeder 2005)	R			
18	<i>Mus macedonicus</i> or/and <i>M. europaeus</i>	? / species not confirmed on specimens			
19	<i>Glis glis</i>	R	LR/nt		(V)
20	<i>Dryomys nitedula</i>	R	LR/nt		R
21	<i>Canis aureus</i>	R			V
22	<i>Canis lupus</i>	R			V
23	<i>Vulpes vulpes</i>	R			
24	<i>Ursus arctos</i>	Accidental		II*	E
25	<i>Mustela nivalis</i>	R			
26	<i>Mustela putorius</i>	R			
27	<i>Martes foina</i>	R			
28	<i>Martes martes</i>	?			
29	<i>Vormela peregusna</i>	R		II	K
30	<i>Meles meles</i>	R			(V)
31	<i>Lutra lutra</i>	R	NT	II	V
32	<i>Felis silvestris</i>	R			(E)
33	<i>Lynx lynx</i>	EXTINCT	NT	II	E
34	<i>Sus scrofa</i>	R			
35	<i>Cervus elaphus</i>	Accidental			E
36	<i>Capreolus capreolus</i>	R			V
37	<i>Rupicapra rupicapra</i>	Accidental		II	R

corded. Forest Dormouse has been found in pellets of Lesser Spotted Eagle (Vlachos 1989) and Tawny Owl *Strix aluco* (Adamakopoulos et al. 1995). Live observations have been made at Agios Rafael, close to Dadia village; the species was photographed within the observation hide at the vultures' feeding table and also at Ambelia, an area just outside the village (K. Pistolas, pers. comm.). In contrast, very few live observations of Fat Dormouse have been made (e.g. at Diavolorema by K. Pistolas, pers. comm.).

Only remains of Grey Hamster *Cricetulus migratorius* have been recorded in Eagle Owl *Bubo bubo* pellets (Adamakopoulos et al. 1995), thus the species' presence within the park is uncertain. It was neither observed nor caught in a neighbouring area of Bulgaria (Minkova 2004).

Similarly to the Grey Hamster, remains of Northern Water Vole *Arvicola terrestris* have been found in pellets of Eagle Owl (Adamakopoulos et al. 1995) and also in pellets of Imperial Eagle (A. Wittgen, in Adamakopoulos et al. 1995). Minkova (2004) states that the species is absent in the nearby Bulgarian area of the Eastern Rhodopes, whereas it occurs to the north of Evros very close to the borders with Bulgaria (Mitchell-Jones et al. 1999). Bank Vole *Clethrionomys glareolus* (*Myodes glareolus* according to Wilson and Reeder 2005) remains have been found in pellets of Eagle Owl (A. Wittgen, in Adamakopoulos et al. 1995). Vohralík and Sofianidou (1992) collected one specimen at Leivaditis, c.100 km to the west of DNP, which at that time was the easternmost finding locality. Voles *Microtus* spp. belonging either to the species Sibling Vole *M. rossiaemeridionalis* (*M. levis* according to Wilson and Reeder 2005) or Guenther's Vole *M. guentheri*, or to both species, are abundant in the park. Hatzisarantou et al. (1962, in Vohralík and Sofianidou 1992) recorded *M. guentheri* around Soufli but the taxonomy of the genus is still very confused and a lot of changes have taken place based on karyotypic analyses. *M. rossiaemeridionalis* (referred to as *M. epiroticus*) has also been recorded in many areas around the DNP (Vohralík and Sofianidou 1992). Whatever the species present, *Microtus* spp. are widespread and numerous all over the park. Extremely mild winters (as the one of 2003–2004) probably contribute to an impressive increase in the number of active burrows/colonies. Despite their abundance there is no evidence that they suffer heavy predation from raptors. Their remains have been identified in pellets of Eagle Owl (A. Wittgen, in Adamakopoulos et al. 1995) and Tawny Owl (Adamakopoulos et al. 1995). Bousbouras (1999) found that open areas in the mature oak forest

are particularly important habitats for *Microtus* spp. and also for *Apodemus* spp.

Remains of the woodmice *Apodemus sylvaticus* and *Apodemus flavicollis* were found in pellets of Lesser Spotted Eagle (Vlachos 1989), Eagle Owl and Tawny Owl (Adamakopoulos et al. 1995) and Imperial Eagle (A. Wittgen, in Adamakopoulos et al. 1995). Vlachos (1989) also stated that he captured a few woodmice in the pine forest, but these were not identified to species. Both species have been recorded as common to abundant in the area around DNP (Vohralík and Sofianidou 1992). Bousbouras (1999) studied their pattern of habitat segregation within the park in spring – summer 1994. He concluded that *Apodemus* spp. are either absent or occur at very low densities in all types of mature pine forests, possibly due to a scarcity of food in the summer. In contrast, in dense oak forest and closed mixed pine-oak forest woodmice are found in low to moderate densities. They occur in higher densities in forest clearings and in the hedgerows between fields. The very high abundance, which appears to exist in cultivated areas, probably results from the fact that *Apodemus* uses the hedgerows for shelter and nesting. Densities are higher in the mature oak woodland with natural clearings than in coppiced forests whilst densities in riparian vegetation are higher than in nearby pine forest. Mice of the genus *Mus* in the area possibly include species such as *Mus musculus/domesticus* (*M. musculus domesticus* according to Wilson and Reeder 2005), which was captured by Bousbouras in 1994 (Bousbouras 1999), but also *Mus macedonicus* might be found in the area (Mitchell-Jones et al. 1999, Macholán et al. 2007) as this was the most common rodent recorded in Thrace by Vohralík and Stefanidou (1992). The presence of both species is very likely. The Ship Rat *Rattus rattus* is very common in villages all over the park.

There are no reports of any *Spalax* species in the entire prefecture of Evros. No mounds belonging to animals of this genus have been observed anywhere in the area, but *Spalax leucodon* is present less than 20 km to the northwest of DNP on Bulgarian territory (Minkova 2004).

## The carnivores

Grey Wolves *Canis lupus* are regularly seen, heard, photographed or shot at within the park, and attacks on domestic stock are very common. No estimate of the size of the park's population exists, but in some years (e.g. 2004) packs with young have been observed and their dens discovered within the park (D. Vasilakis, pers.

comm.). Wolves are very often attracted to the offal and corpses left at the feeding table for vultures, but these are accessible to them only when left outside the fences, a very rare situation. Observations were particularly frequent in 1996–1998 when up to 15 individuals were counted simultaneously (D. Skartsi, pers. comm.).

Golden Jackals *Canis aureus* were common in the park in the past, but nowadays they are recorded within it only rarely. Giannatos (2004) provided evidence that a small group of jackals was established in the area around Soufli, Kornofolia and Lykofi villages around 2000 after an absence of 10–15 years. According to information from local people and the Forest Service a fair number of jackals colonised the area of Soufli around 1998. A group of 2–4 animals was present between 1999 and 2002 around the Monastery of Kornofolia (E. Kakalis, pers. comm.), and a few animals were heard howling in 2002 and 2003 very close to the eastern borders of the park near the Evros River at the village of Lykofi. Between 2004 and 2008 there have been five documented cases of Golden Jackals being killed by vehicles on the national road that forms the eastern border of the park. Therefore the fate of this small pack is unknown. Communication between the Soufli group and those in the Evros delta is not improbable (Giannatos 2004).

The Red Fox *Vulpes vulpes* is very common and widespread all over the park. Fox remains have also been found in a nest of Egyptian Vulture (D. Bousbouras, in Adamakopoulos et al. 1995).

A few years ago, a Soufli inhabitant described an animal with characteristics of the Raccoon Dog *Nyctereutes procyonoides*. This was the sole, but unconfirmed, reference ever for the species in Greece. Mitchell-Jones et al. (1999) in the Atlas of European Mammals mention that the species is spreading southwards in Bulgaria and has reached the Greek-Bulgarian border. However, in a more recent paper on the large mammals of the south-eastern Rhodopes, Spassov and Markov (2004) are uncertain whether the species exists in that area, which is very close to DNP. On the other hand, on 7 May 2005 a dead animal was found and photographed on road N90 at Dialekto just south of Xanthi, c. 100 kilometres to the west of the park (J. F. Noblet, pers. comm.). This is the first documented record of this species in Greece and thus its occurrence in the park or the wider area cannot be completely ruled out.

The Weasel *Mustela nivalis* is common and widespread all over the park, but no abundance estimates exist. The Western Polecat *Mustela putorius* was still described as “common” around villages and more specifically around Soufli in the 1980s (E. Kakalis, pers.

comm.) It has decreased notably since, but some observations are still being made (J. Elloriaga and E. Kakalis, pers. comm.): Soufli, Dadia village, between Katrantzides and Poulianes (all during 2005). The polecat was also observed by Helmer and Scholte (1985). No density or abundance estimates exist. The Beech Marten *Martes foina* is very common and widespread all over the park. Many are struck by cars (Bakaloudis et al. 2007). The species has been found in pellets of Golden Eagle (A. Wittgen, in Adamakopoulos et al. 1995). No density or abundance estimates exist. The Pine Marten *Martes martes* has never been observed within the park but has been recorded in adjoining areas so its presence within the park cannot be entirely ruled out. It was observed by Helmer and Scholte (1985) a few kilometres to the south of the park. At least one Marbled Polecat *Vormela peregusna* was found killed by a car on the crossroad to Dadia, in May/June 2003 (D. Bakaloudis, E. Kakalis, J. Elloriaga, pers. comm.) and two more animals were found dead in other places in the park. A live animal has once been observed close to the farmland zone of Soufli. The species was also observed by Helmer and Scholte (1985) and has been found in pellets of Golden Eagle (A. Wittgen, in Adamakopoulos et al. 1995). The Badger *Meles meles* is very common and widespread all over the park and many animals are killed by cars (Bakaloudis et al. 2007). Remains have also been found in pellets of White-tailed Eagle *Haliaeetus albicilla* (A. Wittgen, in Adamakopoulos et al. 1995). No density or abundance estimates exist. Markings made by Eurasian Otters *Lutra lutra* are sometimes observed, mainly in the lower parts of the streams discharging into Evros River, whilst odd individuals are occasionally met upstream close to the Dadia village (K. Pistolas pers. comm. and G. Catsadorakis pers. obs.). Abundance estimates for the otter are not available. However, compared with the only available qualitative descriptions of its abundance and spatial distribution, viz. those of Helmer and Scholte (1985) for the years 1983–84, the very sparse present-day frequencies of tracks and markings imply a dramatic decline.

Numerous observations of live animals and road kills exist for the Wild Cat *Felis silvestris* (Bakaloudis et al. 2007). Vlachos (1989) reports a Wild Cat killing Lesser Spotted Eagle chicks. The last observation of a live Lynx *Lynx lynx* is said to have been made in 1969 close to Gibraina Hill (K. Pistolas, pers. comm.). The species is considered extinct in Greece. The Brown Bear *Ursus arctos* has never been resident in the park or even regularly observed there. Those very few records that exist probably involve animals that have wandered away from

their normal ranges. One individual was killed in 1972 and the most recent records were in 1993 when an individual destroyed a number of bee-hives close to Kitri-nopetra (Adamakopoulos et al. 1995) and in 2008 and 2009, when 2–3 individuals stayed for some weeks in the park. Brown Bears are more often observed around Mikro Dereio a few kilometres to the north-west of the park (Adamakopoulos et al. 1995).

## The ungulates

The Wild Boar *Sus scrofa* is very widespread and abundant in the park and constitutes the main large quarry of local hunters. The Roe Deer *Capreolus capreolus* has quite a broad distribution but a sparse population and is heavily poached. The Red Deer *Cervus elaphus* has never been a resident or been regularly observed in the park. The last known record was a wandering individual which was killed by hunters in the late 1980s. It is supposed to have reached Greece from Bulgaria where there is a resident population in the Eastern Rhodopes (Spassov and Markov 2004). It seems that the Fallow Deer *Dama dama* existed in the area a few centuries ago and it certainly did so a few thousand years ago. It is increasing in similar habitats in adjacent parts of Bulgaria (Spassov and Markov 2004). The sole record of Chamois *Rupicapra rupicapra* is that of a male who apparently had been wandering around for a few days in August 2004 in the Kotronia area, where it was observed and photographed (Th. Skartsi pers. comm.).

## Faunistic and biogeographic notes

Excluding bats, the overall number of mammalian species recorded with certainty in the DNP is 30. There is weaker or stronger indirect evidence for the presence of an additional seven species (*Cricetulus migratorius*, *Arvicola terrestris*, *Clethrionomys glareolus*, one or more species of *Microtus* or *Mus*, *Martes martes* and *Nyctereutes procyonoides*). The presence of *Myomimus roachi*, *Neomys anomalus* and *Apodemus mystacinus* (*A. epimelas* according to Wilson and Reeder 2005) may also be possible judging from their known ranges, which are close to or include DNP (Mitchell-Jones et al. 1999). However, *Apodemus mystacinus* is not present in Turkish Thrace (B. Kryštufek, pers. comm.). Thus, the total number of mammal species in the park is estimated as being between 62 and 64, including the 24 species of bats. The identification of some rodents and insectivores to species

is as yet unclear and much more survey and taxonomic work needs to be done. Reliable taxonomic conclusions cannot be drawn because of lack of sufficient systematic studies and unbalanced research intensity. The status of all rodents, insectivores and mustelids in the DNP is very poorly known. In general, more work has to be done on the distribution, abundance and taxonomy of the mammalian species within the park. From a biogeographical point of view the area is situated close to the border between Europe and Asia, so the presence of Anatolian elements could be expected. Such elements that belong to the fauna of the area with certainty are: *S. citellus*, *M. rossiaemeridionalis* and *Vormela peregusna*, while the presence of *Cricetulus migratorius*, *Mus macedonicus* and *Myomimus roachi* so far remains unconfirmed.

Two species, *Lynx lynx* and *Spermophilus citellus*, are considered extinct, with the latter much more likely to recolonise the area. The DNP lies at the edge of the geographic ranges and ecological requirements of some large-sized species (*Cervus elaphus*, *Rupicapra rupicapra* and *Ursus arctos*). Their occurrence in the park must be considered as accidental while many species seem to occur, if at all, in very low numbers (Eurasian Otter, Fat Dormouse, Marbled Polecat, Western Polecat, Golden Jackal). Additionally, the area around the park is the sole locality for *Mustela putorius* in the country. The record of *Suncus etruscus* is also of interest. Of rodents, the area hosts c. 15–17 species and so does not belong to any of the hot-spots for species richness in Europe (Kryštufek and Griffiths 2002).

## Management and conservation notes

Under the present circumstances few conservation and management measures can be suggested for the small mammals, beyond a continuous and coordinated effort to preserve the landscape mosaic and the natural hedges along the cultivated fields. As it happens with other vertebrate and invertebrate groups (Kati 2001, Kati et al. 2004), the areas with the highest densities of small mammals are those where an intricate mosaic exists, with woodland stands, open grasslands, natural hedges, cultivated fields, brush thickets and rocky areas.

Among the mammals, the Brown Hare and the Wild Boar are legal game, but the control of infringements of hunting laws and regulations is far from sufficient. For instance, Roe Deer suffer heavily from poaching and wolves are also shot. A heavy toll consisting of hundreds of Badgers, Red Foxes and, especially, Beech Martens and hedgehogs is taken by vehicles on the asphalt roads



(Bakaloudis et al. 2007). This is a serious mortality factor which may affect their populations and which especially affects dispersing immature animals. Unfortunately, poisoned baits are still used by hunters for controlling the populations of Red Fox, which is considered the main predator of Brown Hares, and secondarily by farmers for controlling the populations of Grey Wolves and Badgers. Although this practice has declined during the last 10 years it still remains a very important mortality factor for these species – with even more grave repercussions for the vulture populations. A large effort has been made by the team of WWF in Dadia to counteract this practice through public awareness campaigns addressed at the wide public.

From a conservation perspective the Eurasian Otter can be considered the most interesting species in the park. The construction by the Forest Service of several small dams and fords along the Diavolorema stream, allegedly for erosion control, but mainly for flow regulation and water retention for irrigation during the summer months, obstruct fish movements along the stream and thus hinder fish from reaching their spawning sites. Thus, fish populations will gradually disappear and otters will be confined to the Evros River. The oncoming droughts due to effects of climate change, the already planned additional interventions on the streams of the park to retain water and the expected decline of fish populations in isolated pools in the upstream parts will certainly further affect the otter's already very low numbers in the park negatively.

A re-introduction of European Souseliks in the park is considered feasible as it would neither be costly nor technically difficult. Besides restoring some lost biodiversity, Souseliks would form a charming tourist attraction and their presence would benefit Long-legged Buzzards and many other raptorial birds as well.

The abundance of small and medium-sized mammals is one of the most decisive factors for the survival of many species of birds of prey as they form a substantial part of their diet. Much more research is needed on the interrelationships between predators and their mammal prey. On the other hand, the abundance of wild, medium- and large-sized mammals, particularly ungulates, is also directly connected to vulture conservation as they form the main source of food in natural conditions. Today, however, were it not for the regular artificial feeding, vulture populations would have vanished or would be at the brink of extinction. To ensure their long-term survival food sources must originate from sufficient numbers of either free-ranging livestock or wild mammals in the park and within a surrounding area of a ra-

dius of at least c. 100 km. However, in case vultures had to rely only upon “wild” food, it is doubtful whether there are easily applicable management measures under which the very low densities of Roe Deer and of the relentlessly hunted Wild Boar could ever increase enough to sustain the large numbers of vultures. Livestock numbers have declined dramatically all over this area. This, in combination with a more efficient disease control has reduced livestock mortality resulting in a very low availability of corpses. Fewer animals and reduced grazing allow woodland to expand into open areas and contribute to landscape homogenization, which too has a serious impact upon the populations of several animals, birds of prey included.

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