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SMALL TERRESTRIAL MAMMALS OF ALBANIA: ANNOTATED LIST AND DISTRIBUTION

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ABSTRACT - We report a synopsis of the small mammals of Albania (Erinaceomorpha, Soricomorpha, Rodentia), outlining both new records and previously published data. Twenty-four species (one hedgehog, six soricomorhps and 17 rodents) have been collected in 161 localities surveyed throughout the country. Nine species (*Neomys anomalus, Crocidura leucodon, Talpa stankovici, Dryomys nitedula, Muscardinus avellanarius, Micromys minutus, Mus macedonicus, Myodes glareolus* and *Microtus thomasi*) are recorded for Albania for the first time. The present list is far from being complete and the probable presence of a further 11 species has to be confirmed.

Key words: Soricomorpha, Erinaceomorpha, Rodentia, Balkans, Albania

RIASSUNTO - ***I micromammiferi dell'Albania: status e distribuzione***. Viene presentato un quadro della distribuzione dei micromammiferi in Albania, evidenziando le specie di recente scoperta così come alcuni dati già pubblicati. L'esame di 161 località distribuite sull'intero territorio nazionale ha permesso di raccogliere informazioni sulla presenza di 24 specie di micromammiferi (1 Erinaceomorpha, 6 Soricomorpha e 17 Rodentia). Nove specie (*Neomys anomalus, Crocidura leucodon, Talpa stankovici, Dryomys nitedula, Muscardinus avellanarius, Micromys minutus, Mus macedonicus, Myodes glareolus* e *Microtus thomasi*) vengono segnalate per la prima volta. L'elenco qui presentato non può essere considerato definitivo. Ulteriori ricerche potrebbero accertare la presenza di altre 11 specie.

Parole chiave: Soricomorpha, Erinaceomorpha, Rodentia, Balcani, Albania

INTRODUCTION

The Balkans, a "miniscule universe" where "the natural landscape has the aspect of a lunar purgatory" (Stillman, 1966), is the most splendid European centre of biodiversity and, therefore, an area of high conservation value (Kryštufek and Reed, 2004). The significance of the peninsula as a European hotspot has been emphasized on the basis of a number of plant and animal

groups (Gaston and David, 1994). For mammals, the high species diversity and endemism is attested for the mountainous regions of the southern Dinarides and the Shara-Pindhos Mountains, which encompass the whole of Albania (Kryštufek and Griffiths, 2002; Kryštufek, 2004). The Balkan region has also been a point of intersection and conflict between a number of very different cultures, ideologies and religions (Kryštufek and Reeds, 2004). Thus the development of natural sciences has been retarded in the entire region in general and in Albania in particular. Although the first records of small terrestrial mammals, which are the subject of this paper, date back to Miller (1912), subsequent studies were published only after 1945 and were largely based on very limited samples (Puzanov *et al.*, 1955; Koçi, 1961; Rosický and Gjini, 1960; Bajrami and Serezi, 1981; Vangjeli, 1987a; Anděra, 1991; Kryštufek, 1994; Prigioni, 1996; Macholán and Vohralík, 1997; Macholán *et al.*, 2003). More comprehensive studies, having been published in the Albanian language (Bego, 1997, 2001, 2003), went largely unnoticed by mammalogists outside the country. Consequently, by the end of the 20th century, the mammal fauna of Albania was the least known in Europe (Prigioni, 1996; Mitchell-Jones *et al.*, 1999).
The aim of this paper is to summarize the current distributional status of small terrestrial mammals belonging to the orders Erinaceomorpha, Soricomorpha and Rodentia in Albania.

METHODS

This paper is largely based on data gathered between 1992 and 2008 (mostly 1997-2007), sampling 161 localities spread over the entire territory of Albania (Fig. 1). Snap trapping and the analysis of *Tyto alba* pellets , as the two main field sampling techniques, were supplemented by direct and indirect (footprints, feeding signs, faeces, burrows, carrions, etc.) observations . Voucher specimens have been deposited at the Museum of Natural Sciences, Tirana University. We also considered materials deposited in the Naturhistorisches Museum of Wien (NMW). Taxonomy and nomenclature follow Wilson and Reeder (2005). Key references were: Petrov (1992) for former Yugoslavia, Kryštufek and Vohralík (1992) for Montenegro, Kryštufek and Petkovski (2003) for Macedonia and Ondrias (1966), Niethammer (1986), Vohralík and Sofianidou (1987) and Sofianidou and Vohralík (1991) for Greece.

STUDY AREA

Albania is located on the eastern coasts of the Adriatic and Ionian seas. In spite of its small surface area (28,748 km^2), the country is topographically highly diverse. The Albanian mountains (the highest peak is Mt. Korab, 2753 m a.s.l.), which are physiographically part of The Alpine Mountains, rise very steeply from the coastal strip and cover 70% of the country. As a consequence of Alpine orogenesis, these mountains are characterized by complex folding and faulting although outcrops of more ancient, volcanic and metamorphic, rocks are common throughout. The northern mountains in particular are singled out by the dominance of carbonate rocks. Thick layers of Late Tertiary or Quaternary sediment cover the 20-30 km wide strip of the coastal lowlands.
Although Albania falls within the temperate zone, topographic diversity and the

combination of Mediterranean and continental influences ensure great climatic and vegetation diversity (Reed *et al.*, 2004).The coastal region enjoys a Mediterranean climate with dry, hot summers and mild, wet winters. Further east the mountains act as a barrier to the penetration of warm air masses. The climate of the mountainous regions is Alpine, with strong shifts in precipitation and temperature depending on height and exposure. Differences in temperature between the coast and inland regions are by far most marked in winter, whilst those in precipitation are stronger in summer Predominant vegetation along the coast is evergreen maquis, which is replaced by oak woodland further inland and finally by beech forests and grasslands at higher altitudes. Forests, which are frequently degraded, cover c. 40% of the whole surface, while meadows/pastures and arable land cover, respectively, 15% and 26% of Albania. Mean human density is 115 inhabitants per km^2, but the mountainous regions are scarcely populated.

ANNOTATED LIST OF SPECIES

Erinaceus roumanicus Barrett-Hamilton, 1900

Shkodër: Velipojë (sea level, June 1992); Thethi (1350 m, June 2001). **Lezhë:** Shengjin (repeated observations). **Durrës:** Rrotull (200 m); Manëz (150 m); Kullë (100 m, July-August 1992). **Tiranë:** Mt. Dajti (1100 m); Vore (200 m, repeated observations). **Lushnjë:** Divjaka Pine Forest (sea level, repeated observations). **Vlorë:** Nartë (sea level, September 1999), Karaburun-Llogora (10-1200 m, September 1999). **Sarandë:** Butrint (0-150 m, May 1998). **Delvinë:** Syri i kaltër (250 m, May 1998). **Librazhd:** Dardhë (1250 m); Stravaj (1500 m); Rajcë (1350 m); Qarrishtë (1450 m, August 1994). **Pogradec:** Velçan (1050 m, September 1994). **Dibër:** Selishtë (1300 m); Korab (1400 m, June 1999). **Korçe:** Prespa e Madhe, Gollomboç (850 m, April 1995); Dardhë (1450 m, August 1996; May 2002; April 2006); Cangonj (950 m, August 1996; May 2002; April 2006).

Records are spread over the whole of Albania (Fig. 2), from sea level to the upper forest line (1500 m). Whilst elsewhere in Europe the hedgehog prefers lowlands and hills between 300 and 800 m a.s.l. (Mitchell-Jones *et al.*, 1999), more than half of our records (= 53%, n = 19) were above 1000 m a.s.l.. As a result of the expanding transport network, the number of road casualties for this species is increasing. Earlier papers refer to this species as *Erinaceus europaeus* (Puzanov and Mitrushi, 1955; Koçi, 1961) or *E. concolor* (Bego, 1997).

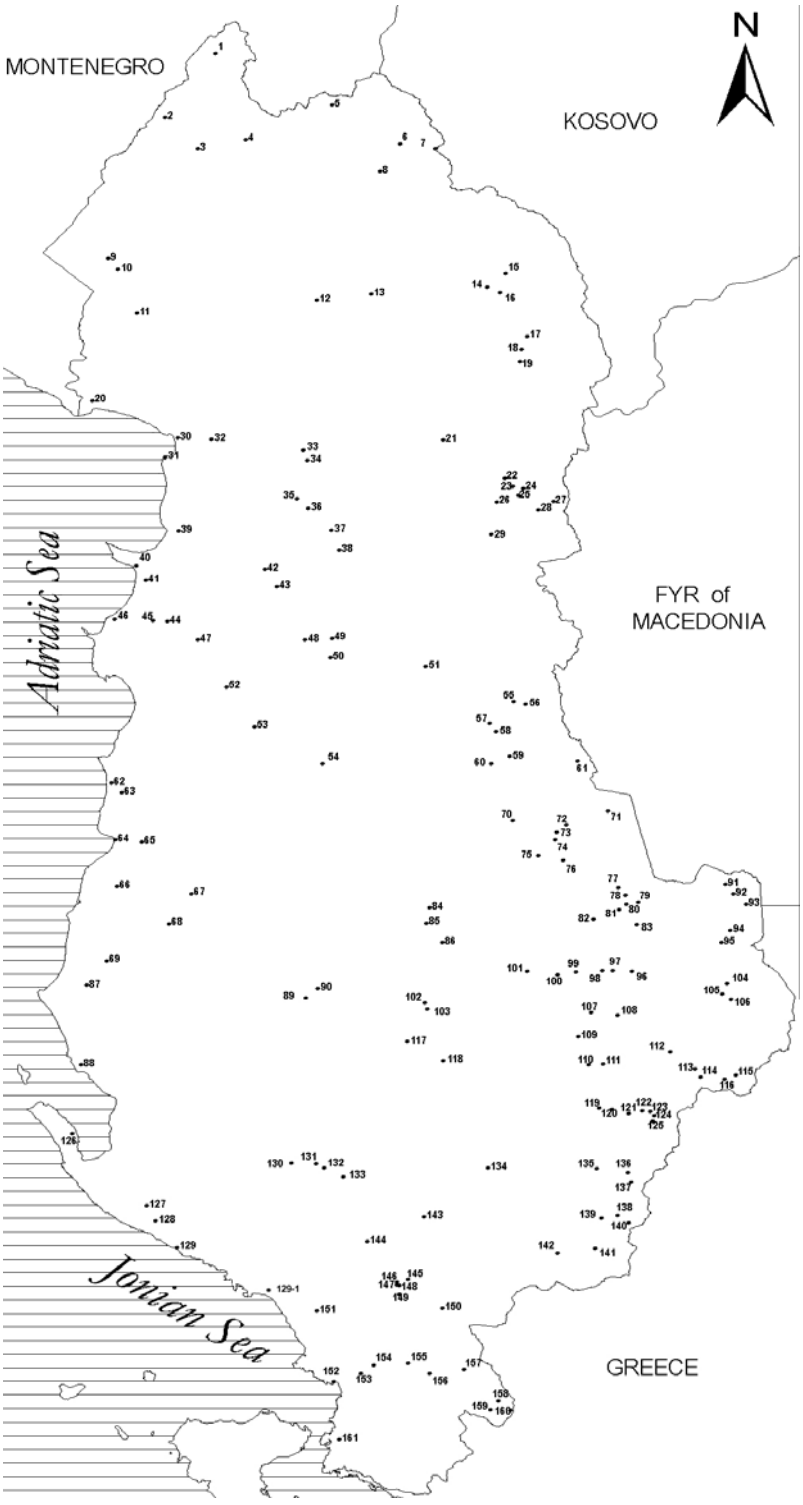
Neomys anomalus Cabrera, 1907

Gjirokastër: Libohovë (230 m) and Lazarat (350 m); 6 specimens from pellets during 2006-2007.

The Mediterranean water shrew is reported for Albania for the first time. Both localities are situated along the Drinos valley in the southern part of the country (Fig. 3). In the Balkans this species is more widespread than *N. fodiens* (e.g. Petrov, 1992), consequently its distribution in Albania is probably underestimated.

Crocidura leucodon (Hermann, 1780)

Durrës: Rrotull (150 m, August 1992, 1♀). **Tiranë:** Mt. Dajti (1100 m, 1994, 1 ♂). **Lushnjë:** Karavasta, Shën Thanasi Monastery (sea level); Xeng, Shën Kolli Monastery (5m, between 2001 and 2008, c. 507 specimens from pellets); Bishqethem, Shën Mari Monastery (0-5 m, January and April 2008, 60 specimens from pellets). **Fier:** Kolli Monastery (0-20 m, January and April 2008, 2 specimens from pellets).


MONTENEGRO
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Ionian Sea

Figure 1 - Localities sampled in Albania for small terrestrial mammals.
1 – Vermosh. 2 – Tamarë. 3 – Bogë. 4 – Thethi. 5 – Çerem. 6 – Tropojë. 7 – Qafë-Morinë. 8 – Chestnut forest of B. Curri. 9 – Gërçar i Poshtëm. 10 – Balçaj. 11 – Shkodër-qytet. 12 – Mehaj. 13 – Kryezi. 14 – Tobël. 15 – Sefoll. 16 – Myç. 17 – Nangë. 18 – Bicaj. 19 – Kolesian. 20 – Velipojë. 21 – Lurë. 22 – Kastriot. 23 – Llasen. 24 – Ravnë. 25 – Pilaf. 26 – Brezhdan. 27 – Korab. 28 – Grevë. 29 – Selishtë. 30 – Shëngjin. 31 – Kune. 32 – Gjoshë. 33 – Fan (Rrëshen). 34 – Tarazh. 35 – Ulzë. 36 – Bushkash. 37 – German. 38 – Komsi. 39 – Fushë-Kuqe. 40 – Draç-Rodon. 41 – Rrotull. 42 – Nojë. 43 – Cudh-Zalli. 44 – Manëz. 45 – Kullë. 46 – Rrushkull. 47 – Vorë. 48 – Mt. Dajti. 49 – Feken. 50 – Qafë-Mollë. 51 – Bizë. 52 – Vaqarr. 53 – Baldushk. 54 – Elbasan (Gracen). 55 – Kosharishtë. 56 – Qarrishtë. 57 – Togëz. 58 – Qendër. 59 – Hotolisht. 60 – Dardhë. 61 – Rajcë. 62 – Spille. 63 – Grethi i vogël. 64 – Divjaka pine forest. 65 – Shën Kolli (Xengu). 66 – Shën Thanasi (Karavasta). 67 – Shën Mari (Bishqethëm). 68 – Shën Kolli (Vajkan). 69 – Apolloni (Pojan). 70 – Stravaj. 71 – Piskupat. 72 – Golik. 73 – Vërri. 74 – Proptisht. 75 – Velçan. 76 – Zëmçë. 77 – Vërdovë. 78 – Gështenjas. 79 – Plloçë. 80 – Stropckë. 81 – Dardhas. 82 – Osnat. 83 – Kalivaç. 84 – Çekrezë. 85 – Nartë. 86 – Skënderbegas. 87 – Shën e Premte (Darzezë). 88 – Nartë. 89 – Gjoroven. 90 – Drobonik. 91 – Goricë e madhe. 92 – Goricë e vogël. 93 – Gollomboç. 94 – Diellas. 95 – Lajthizë. 96 – Maliq-fshat. 97 – Plovisht. 98 – Senishtë. 99 – Lozhan. 100 – Popçisht. 101 – Moglicë. 102 – Tomorr. 103 – Ujanik (Mt. Tomorri). 104 – Moravë-Cangonj. 105 – Bickë. 106 – Vranisht. 107 – Voskopojë. 108 – Gjonomadh. 109 – Gjergjevicë. 110 – Vithkuq. 111 – Leshnije. 112 – Boboshticë. 113 – Dardhë. 114 – Arrëz. 115 – Çetë. 116 – Qytezë. 117 – Bogove. 118 – Radësh. 119 – Boshanj. 120 – Qafëzezë. 121 – Mollas. 122 – Shtikë. 123 – Butkë. 124 – Bezhan. 125 – Milec. 126 – Karaburun. 127 – Dukat. 128 – Llogora. 129 – Dhërmi; Qeparo. 130 – Salari. 131 – Zharrë. 132 – Turan. 133 – Uji i ftohtë. 134 – Bredhi i Hotovës. 135 – Kagjinas. 136 – Prodanj. 137 – Gjonçë. 138 – Sotiraj. 139 – Radanj. 140 – Gërmenj-Shelegurë. 141 – Leskovik. 142 – Mërcëq. 143 – Zheji. 144 – Humelicë. 145 – Arshi Lengo (Antigone). 146 – Cfakë. 147 - Kala (City castle); Gjirokastër-qytet. 148 – Dunavat. 149 – Lazarat. 150 – Libohovë. 151 – Kalasë. 152 – Sarandë-qytet. 153 – Vurgu. 154 – Messopotami. 155 – Kronjë. 156 – Syri i kaltër. 157 – Bodrishtë. 158 – Llongo. 159 - Bredhi i Sotirës (Sotirë). 160 – Koshovicë. 161 – Butrint.
Districts: Berat (89, 90); Delvinë (151, 153–156); Devoll (105, 106, 114–116); Dibër (21 – 29); Durrës (40, 41, 44–46); Elbasan (54); Ersekë (119–125); Fier (68, 69, 87); Gjirokastër (143–150, 157–160); Gramsh (84–86); Has (14–16); Kavajë (62, 63); Korçë (91 – 101, 104, 107–113); Krujë (42, 43); Kukës (17–19); Laç (39); Lezhë (30–32); Librazhd (55–61, 70); Lushnjë (64–67); Malësia Madhe (1, 2, 9, 10); Mat (35–38); Mirditë (33, 34); Përmet (134, 142); Pogradec (71–83); Pukë (12, 13); Sarandë (152, 161); Shkodër (3, 4, 11, 20); Skrapar (102, 103, 117, 118); Tepelenë (130–133); Tiranë (47–53); Tropojë (5–8); Vlorë (88, 126–129).

Ersekë: Butkë (1108 m, 2007, 1♀). **Gjirokastër:** Bodrishtë (430 m); Lazarat (350 m); Castle (520 m); Libohovë (230 m); Antigone (210 m); **Delvinë:** Messopotami (50 m); Kalasë (40 m); Vurgu (0-10 m). At least 154 specimens from pellets from the districts of Gjirokastër and Delvinë.

The bicoloured shrew is reported for Albania for the first time. Although no records are available from the northern part of the country, the species is putatively widespread (Fig. 4). Accordingly, the bicoloured shrew is common around Lake Scutari (Shkodra) in Montenegro (Petrov, 1992). Localities in Albania range from the sea level up to 1100 m.

Crocidura suaveolens (Pallas, 1811)

Durrës: Rrotull (150 m, August 1992). **Tiranë:** Mt. Dajti (1100 m, 1992); **Lushnjë:** Divjaka Pine Forest (sea level, May 1995, 1♀ found dead on a sand dune); Xeng, Shën Kolli Monastery, and Karavasta, Shën Thanasi monastery (2001-2008, 166 specimens from pellets); Bishqethëm, Shen Mari Monastery (0-5 m, January and April 2008, 68 specimens from pellets).

Fier: Apolloni (April 1998, 2 specimens from pellets); Darzezë, Shën e Premte (sea level, 2002, 21 specimens from pellets); Vajkan, Shën Kolli Monastery (0-20 m, January and April 2008, 7 specimens from pellets). **Vlorë:** Dhërmi (150 m, May 1995, 1 specimen from pellets). **Delvinë:** Mesopotami (50m, 1992, 1995, 1996, 2007); Fusha e Vurgut (0-10 m) and Kalasë (40 m; 2006 and 2007; 20 specimens from pellets). **Pukë:** Kryezi (June 2006, 1♂). **Librazhd:** Togëz (233 m, August 2006, 1 ♀ and 1 ♂). **Devoll:** Vranisht (909 m, September 2006, 1 ♀). **Skrapar:** Bogovë (207 m, October 2006, 1 ♀). **Berat:** Drobonik (180 m, October 2006, 1♂). **Tepelenë:** Uji i Ftohtë (176 m, November 2006, 1♂). **Kavajë:** Greth i Vogël (March 2007, 1♀); Spille (sea level, March 2007, 1♀). **Malësia e Madhe:** Kçar i Poshtëm (April 2007, 1♂). **Korçë:** Goricë e Vogël (862 m, September 2007, 1♂). **Ersekë:** Bezhan (1065 m, October 2007, 1♂). **Pogradec:** Gështenjas (756 m, October 2007, 1♀). **Gjirokastër:** Antigone (210 m); Lazarat (350 m); Bodrishtë (430 m); Libohove (230 m); during 2005-2007, c. 31 specimens from pellets.

The lesser white-toothed shrew is the most widespread shrew in Albania and was found from sea level up to 1200 m (Fig.5). Interactions between the two *Crocidura* species are poorly understood. Although *C. suaveolens* was found on a larger number of localities (29) than *C. leucodon* (16 localities), more than twice as many specimens of the latter were retrieved from owl pellets (723 *vs.* 316). For both species, c. 50% of records are from lowlands (<400 m a.s.l.).

Suncus etruscus (Savi, 1822)

Durrës: Durrës (from owl pellets; Kahman and Altner, 1956). **Delvinë:** Messopotami (50 m, 1995, 1996, 2007, 5 specimens). **Lushnjë:** Xeng, Shën Kolli Monastery (5 m) and Karavasta, Shën Thanasi Monastery (sea level; 2000-2008, 275 specimens); Bishqethëm, Shën Mari Monastery (0-5 m, January and April 2008, 29 specimens). **Fier:** Darzezë, Shen e Premte Monastery (sea level, 2002, 35 specimens); Vajkan, Shën Kolli Monastery (0-20 m, January and April 2008, 9 specimens). **Gjirokastër:** Libohovë (230 m), Lazarat (350 m) and Antigone (210 m), 5 specimens during 2006-2007.

All the examined Etruscan shrews (n = 353) were from *T. alba* pellets. Albanian records are all from coastal lowlands, below 400 m a.s.l. (Fig.6). Given its occurrence in coastal Montenegro (Petrov, 1992), it is doubtlessly present also in northern Albania. In the Balkans this tiny shrew is similarly restricted to the coastal regions below 600 m a.s.l. (Vohralík and Sofianidou, 2000) and is common in owl pellets from the northeastern Adriatic coast (e.g. Lipej and Kryštufek, 1991).

Talpa caeca Savi, 1822

Tropojë: Tropoja (=Tropojë; Kryštufek, 1994); Çerem (1800-2000 m). **Tiranë:** Bizë (1700 m); Mt. Dajti (1100 m). **Librazhd:** Stravaj (1300 m); Dardhë (1700 m). **Skrapar:** Tomorr (Mt. Tomorri, 1700-1900 m)

Three species of moles are partly sympatric in the countries surrounding Albania (Mitchell-Jones *et al*., 1999). Although they are well defined by their diploid chromosomal numbers (Soldatović and Dunđerski, 1972), cranial differences are slight and vary geographically (Kryštufek, 1994). Materials from Albania were earlier reported as *T. caeca* (Bego, 1997, 2001),

but their re-examination revealed also the presence of *T. stankovici*. The Blind mole is known in Albania from a small number of localities at high altitude (1100-2000 m). We observed characteristic mole-hills also in other parts of the country. Particularly, those from the northern Alpine pastures very likely belonged to *T. caeca* (Fig.7).

Talpa stankovici V. Martino and E. Martino, 1931

Durrës: Kullë (30 m, repeated observations). **Tiranë:** Vaqarr (150 m, repeated observations); Vorë (200 m, March 2000, 1 ♂). **Lushnjë:** Xeng, Shën Kolli Monastery (5m, 2002 and 2007, 2 specimens from pellets); Divjaka Pine Forest (sea level, January 2008, 1 ♂). **Ersekë:** Boshanj (890 m, October 2007, 1♂).

Records from the coastal area of central Albania (Fig. 7) are the first evidence connecting the contiguous range of *T. stankovici* in Macedonia and Greece to an isolated occurrence from Ulcinj, Montenegro (Kryštufek, 1994). Given its wide altitudinal occurrence in Albania (5-890 m) and Macedonia (up to 2200 m; Petrov, 1992) *T. stankovici* is putatively widespread to the south of the River Drin.

Sciurus vulgaris Linnaeus, 1758

Lezhë: Kune (sea level, repeted observations). **Lushnjë:** Divjaka Pine Forest (sea level). **Skrapar:** Mt. Tomorri (1600 m). **Tropojë:** Çerem (1700 m, August 1995); Bajram Curri (600 m, August 1995). **Tiranë:** Mt. Dajti (1200 m); Feken (1300 m); Bizë (1600 m), Baldushk (300 m). **Mirditë:** Fan (450 m). **Dibër:** Lurë (1000-1600 m). **Durrës:** Rrotull-Draç-Rodon (100-200 m). **Vlorë:** Llogora (1100 m). **Librazhd:** Dardhë (1400 m); Stravaj (1350 m); Rajcë (1200-1800 m); Qarrishtë (1300-1700 m). **Korçë:** Goricë e madhe (1050m); Moravë (1600 m); Cangonj (950 m); Vithkuq (1400 m). **Ersekë:** Gërmenj-Shelegurë (1200-1800 m). **Përmet:** Bredhi i Hotovës (1300 m). **Gjirokastër:** Bredhi i Sotirës (1300-1800 m); Zheji (1500 m). **Delvinë:** Syri i kaltër (350 m).

The Eurasian red squirrel is widespread in forested regions throughout Albania, from sea level to the tree-line (1600-1800 m a.s.l.). Most of our records are based on observations of animals and their chracateristic signs (footprints, feeding signs) or vocalizations (Fig. 8). Dark colouration was dominant. In 1960-1970 this animal was reported as a game species (Puzanov and Mitrushi, 1955; Koçi, 1961).

Glis glis (Linnaeus, 1766)

Tiranë: Mt. Dajti (1100 m, October 1992, 1♀); Qafë Mollë (800 m, August 1996, 1♀). **Lushnjë:** Divjaka Pine Forest (sea level, May 2003, 1♂).

Although records of the fat dormouse are scarce (Fig. 9), this species is very likely widespread in the forested regions of Albania (cf. Mitchell-Jones *et al.*, 1999). Our specimens were found in different forest types**:** beech (Mt. Dajti), chestnut (Qafë Mollë) and pine woods (Divjaka). In the 1960s it was considered as a game species (Puzanov and Mitrushi, 1955).

Dryomys nitedula (Pallas, 1779)

Librazhd: Stravaj (1300 m, August 1994, 1 ♀). **Korçë:** Goricë e Vogël (825 m, September 2007, 1 ♀).

Two subadult females were trapped (Fig.9), one in an old growth beech forest (Stravaj) and one in an oak wood (Goricë e Vogël). Albeit rare, the forest dormouse is widespread in the Balkans (Kryštufek and Vohralik, 1994); consequently it is likely to be more widespread in the broadleaved forests of Albania.

Muscardinus avellanarius (Linnaeus, 1758)

Tiranë: Vorë (250 m, 2004, 1♂). **Lushnjë:** Xeng, Shën Kolli Monastery (2004 and 2007, 2 specimens from pellets); Karavasta, Shën Thanasi Monastery (2006 and 2007, 2 specimens from pellets); Bishqethëm, Shën Mari Monastery (January 2008, 1 specimen from pellets). **Fier:** Darzezë, Shën e Premte Monastery (sea level, 2002, 1 specimen from pellets). **Gjirokastër:** Arshi Lengo, Antigone (210 m), Libohovë (230 m), and Lazarat (350 m), 5 specimens from pellets during 2006-2007. **Delvinë:** Messopotami (50 m, 2006 and 2007, 13 specimens from pellets); Kalasë (40 m, 2006, 2 specimens from pellets). **Korçë:** Dardhë (1494 m, October 2007, 1♀).

Although the common dormouse had already been collected in June 1914 (NMW, specimen from Vermosh, 1150 m), its occurrence in Albania has not been published so far. We collected two more specimens, one in mixed woodland on the hills near Vorë, and one in a mixed forest near Dardhë. A further 26 specimens were retrieved from *T. alba* pellets. Compared to the other two dormouse species, *M. avellanarius* seems to be surprisingly common in Albania (Fig. 10). It is also noteworthy that its altitudinal range extends from the sea level up to 1494 m, whilst in neighbouring countries (Montenegro, Macedonia), the common dormouse has been found only in mountain forests (pers. obs.). We thus suggest that the common dormouse is probably widespread in Albania.

Apodemus sylvaticus (Linnaeus, 1758)

Durrës: Rrushkull (sea level, 1992, 2♂ and 1♀). **Tiranë:** Mt. Dajti (1100 m, 1992, 5♂ and 4♀). **Shkodër:** Bogë (1993, altitude 950 m, 1♀); Velipojë (sea level, 1995, 1♂). **Tropojë:** Bajram Curri (450 m and 650 m, 1993, 3♂). **Librazhd:** Dardhë (1700 m, August 1994, 1♂); Stravaj (1400 m, August 1994, 1♂); Qendër (240 m, 2006, 1♂). **Lushnjë:** Xeng, Shën Kolli Monastery (5 m), and Karavasta, Shën Thanasi Monastery (sea level, 2001-2008, c. 75 specimens from pellets); Divjaka Pine Forest (sea level, 1995, 5♂ and 1♀); Bishqethëm, Shën Mari Monastery (0-5 m, January and April 2008, 17 specimens from pellets). **Fier:** Darzezë, Shën e Premte (2002, 3 specimens from pellets). **Skrapar:** Ujanik (1400 m, July 1995, 3♂ and 1♀). **Delvinë:** Fusha e Vurgut (0-10 m), and Messopotami (50m, 1996, 2006 and 2007, 31 specimens from pellets). **Has:** Myç (386 m, 2006, 1♂). **Pukë:** Kryezi (650 m, 2006, 1♂ and 1♀). **Lezhë:** Gjoshë (74 m, 2006, 1♀); Kune (sea level, 2007, 1♂). **Malësia e Madhe:** Tamarë (293 m, 2006, 1♂); Balçaj (10 m) and Kçar i Poshtëm (15 m, 2007, 5♂ and 3♀). **Dibër:** Brezhdan (580 m, 1♀), Grevë (735 m, 1♀ and 1♂). **Mirditë:** Tarazh (123 m, 2006, 1♀). **Gjirokastër:** Humelicë (203 m, 2006, 1♂); Arshi Lengo, Antigone (210 m), Castle (520 m), Lazarat (350 m), Libohovë (230 m) and Bodrishtë (430 m), 13 specimens from pellets during 2006-2007. **Kavajë:** Spille (sea level, 2007, 4♂ and 2♀). **Laç:** Fushë-Kuqe (sea level, 2007, 1♀ and 1♂). **Korçë:** Maliq (Vangjeli, 1987b); Plovisht (791 m, 2007, 1♀); Lajthizë (1063 m, 2007, 1♀); Dardhë (1438-1538 m, 2007, 2♀); Gjergjevicë (1009 m, 2007, 1♂). **Ersekë:** Gjonçë (1285 m, 2007, 1♂); Butkë (1108 m, 2007, 4♀); Bezhan (1064 m, 2007, 1♀); Mollas (912 m, 2007, 2♀).

In the Balkans, the taxonomy of field mice from the *Sylvaemus* group (sensu Musser *et al.*, 1996) has not yet been completely agreed upon. A subspecies of this group, *Apodemus sylvaticus stankovici*, described for the Macedonian side of Mt. Korab has been considered to represent a form of *A. flavicollis* (Kryštufek and Stojanovski, 1996) or a true species, *A. stankovici* (Petrov, 1994). More recently, Bugarski-Stanojević *et al.* (2007) questioned the presence of *A. sylvaticus* in the Balkans, although the identity of specimens from Greece was ascertained by mitochondrial DNA cytochrome *b* sequences (Michaux and Filippucci, 2005). Our identification is based on morphological characteristics that allow the distinction of *A. sylvaticus* and *A. flavicollis* in the western Balkans (Kryštufek and Stojanovski, 1996). *A. sylvaticus* is widespread in Albania from sea level up to 1700 m a.s.l. (Fig. 11). The majority of records are from lowlands (<500 m, 46%), followed by the altitudes above 1000 m (36%).
A. sylvaticus had been previously reported for Albania by Rosický and Gjini (1960) and Vangjeli (1987b).

Apodemus flavicollis (Melchior, 1834)

Durrës: Rrotull (200 m, 1992, 3♀). **Tiranë:** Mt. Dajti (1100 m, 1992, 9♂ and 4♀; 1072 m, 2006, 1♀); Feken (1300 m, 1993, 3♂). **Librazhd:** Dardhë (1700 m, August 1994, 4♂ and 3♀); Qarrishtë (1224 m, 2006, 1♀ and 1♂); Kosharishtë (1356 m, 2006, 1♂); Togëz (233-266, 2006, 2♂); Qendër (248 m, 2006, 3♀ and 1♂); Hotolisht (2007, 2♂ and 1♀). **Skrapar:** Ujanik (1400 m, 1995, 2♂). **Delvinë:** Syri i Kaltër (150 m, 1996, 3♀ and 2♂); Kronjë (2007, 2♀ and 1♂); Messopotami (50 m, 1996 and 2007, 4 specimens from pellets). **Vlorë:** Dhërmi (150 m, 1995, 1 specimen from pellets); Llogora (822 m, 2006 and 2007, 2♂; 1027 m, 2007, 2♀ and 1♂). **Pukë:** Kryezi (650 m, 2006, 2♂ and 1♀). **Tropojë:** Qafë-Morinë (2006, 1♂). **Dibër:** Brezhdan (580 m, 2006 and 2007, 3♀ and 3♂); Pilaf (606 m, 2006 and 2007, 3♀ and 1♂); Llasen (712 m, 2006 and 2007, 4♀ and 1♂); Ravnë (725 m, 2006, 1♂); Grevë (735 m, 2006, 2♂); Kastriot (650 m, 2007, 1♀). **Përmet:** Mërcëq (392 m, 2006, 1♀). **Ersekë:** Gërmenj (973-985 m, 2006, 2♂ and 1♀); Sotiraj (1027 m, 2006, 4♀ and 2♂); Radanj (1212 m, 1♀ and 1♂); Prodanj (1025 m, 2007, 1♂); Kagjinas (1025 m, 2007, 1♀); Leskovik (1003 m, 2007, 1♂); Mollas (912-1009 m, 2007, 3♂ and 2♀); Bezhan (1064 m, 2007, 2♂); Milec (1082 m, 2007, 1♀ and 2♂). **Mat:** Komsi (395 m, 2006, 1♂); German (391 m, 2006, 1♂); Bushkash (152 m, 2006, 1♂); Ulzë (154-160 m, 2006, 2♀ and 1♂). **Krujë:** Cudh-Zalli (729 m, 2006, 1♀); Nojë (697 m, 2006, 1♀). **Korçë:** Voskopojë (1315 m, 2006, 5♀); Voskopojë (1266 m, 2007, 2♂ and 1♀); Gjonomadh (1185 m, 2006, 1♀); Lozhan (716 m, 2007, 2♂ and 1♀); Popçisht (844 m, 2006, 2♂ and 1♀); Senishtë, (762 m, 2006, 1♀); Diellas (1144 m, 2007, 1♂); Goricë e Vogël (862 m, 2007, 1♀); Leshnije (1089 m, 2007, 1♂); Boboshticë, (1352 m, 2007, 1♀); Dardhë (1494 m, 2007, 2♀); Gjergjevicë (1009-1181 m, 2007, 3♀ and 1♂). **Devoll:** Bickë (947 m, 2006, 1♀); Vranisht (909 m, 2006, 1♂); Arrëz (1033-1113 m, 2007, 2♀ and 2♂); Qytezë (1029 m, 2007, 4♀); Çetë (989 m, 2007, 1♂). **Gramsh:** Çekrezë (219 m, 2006, 1♀ and 2♂); Nartë (481 m, 2006, 1♂); Skënderbegas (486 m, 2006, 1♂). **Tepelenë:** Turan (246 m, 2006, 1♀); Salari (584 m, 2006, 1♂). **Lushnjë:** Xeng, Shën Kolli Monastery, and Karavasta, Shën Thanasi Monastery (2001-2008, 6 specimens from pellets); Divjaka Pine Forest (sea level, 2007, 1♀); Bishqethëm, Shën Mari Monastery (January and April 2008, 4 specimens from pellets). **Malësia e Madhe:** Kçar i Poshtëm (15 m, 2007, 1♂);

Balçaj (10 m, 2007, 1♀). **Gjirokastër:** Lazarat (350 m, 2006, 1 specimen from pellets); Llongo (2007, 3♀); Koshovicë (2007, 4♀ and 1♂); Sotirë (2007, 1♀ and 2♂). **Kukës:** Kolesian (750 m, 2007, 2♂); Bicaj (501 m, 2007, 1♂). **Pogradec:** Vërdovë (1151 m, 2007, 2♀); Kalivaç (1131 m, 2007, 1♀); Gështenjas (756 m, 2007, 1♀); Plloçë (813 m, 2007, 1♂); Stropckë (813 m, 2007, 1♀); Dardhas (1188 m, 2007, 1♀); Osnat (1355 m, 2007, 1♀).

The yellow-necked field mouse is the most common and widespread small mammal in Albania (Fig.12), except for coastal lowlands, where its habitats have been heavily degraded by agriculture and *A. sylvaticus* predominates. The typical habitat of *A. flavicollis* is forest and woodland: oak forests at 150-860 m a.s.l., beech forests at 1100-1700 m a.s.l., and mixed forests, pine stands and fir forests at intermediate altitudes (730-1350 m). Degraded forests, particularly of oak, are as well inhabited as preserved mature stands. Specimens were collected also in hedgerows, orchards and Alpine meadows just above the tree-line. Most records (78%, n = 64) were from areas above 500 m a.s.l.
A. flavicollis had been previously reported for Albania by Rosický and Gjini (1960), Vangjeli (1987b) and Bego (1997).

Apodemus epimelas (Nehring, 1902)

Tiranë: Mt. Dajti (600 and 1100 m, 1992, 3♀ and 10♂). **Tropojë:** B.Curri (1993, degraded woodland, altitude 350 m, 1♂); **Korçë:** Gollomboç (1995, degraded woodland, altitude 900 m, 1♂); **Vlorë:** Llogora (1996, Pine forest, with very well developed understory, altitude 950 m, 1♀); Llogora (2006, altitude 732 – 919 m, 2♀ and 1♂); Dukat (2006, altitude 415 m, 1♀); Llogora (2007, altitude 822 and 919 m, 1♀ and 1♂); **Delvinë:** Messopotami (50 m, 1996, degraded woodland, 1 specimen from pellets); Kalasë (30 m, 2006, degraded woodland, 3 specimens from pellets); **Tepelenë:** Zharrë (2006, degraded woodland, 1♀).

Most western broad-toothed field mice were found in degraded woodland on rocky ground. This is surprising because open rocky areas are its main habitat further north, in former Yugoslavia (Petrov, 1992). Records are quite scarce for Albania, nevertheless we suggest this mouse is widespread on karstic substrates (Fig. 13). In Albania this mouse is present between 350 and 1100 m a.s.l., but it has been recorded up to 1600 m a.s.l. in neighbouring regions (Petrov, 1992). This species has been previously reported as *A. mystacinus* (Rosický and Gjini, 1960; Bego, 1997, 2001), even if Miller (1912) had already identified a sample from northern Albania as *A. epimelas*.

Mus musculus Linnaeus, 1758

Lushnjë: Xeng, Shën Kolli Monastery (5m), and Karavasta, Shën Thanasi Monastery (sea level, 2000-2008, 10 specimens from pellets); Bishqethëm, Shën Mari Monastery (2008, 9 specimens from pellets). **Pukë:** Kryezi (650 m, 2006, 1♀). **Kukës:** Nangë (530 m, 2007, 1♂). **Gjirokastër:** Lazarat (479 m, 2007, 2♂); Dunavat (374 m, 2007, 1♀). **Tiranë:** Tirana (September 1960; Macholán et al., 2003); Mt. Dajti (1072 m, 2007, 1♀); Feken (1188 m, 2007, 1♀); Qafë-Mollë (686 m, 2007, 1♀). **Skrapar:** Radësh (2007, 1♂). **Vlorë:** Qeparo (May 1958; Macholán et al., 2003). **Korçë:** Moglicë (844 m, 2007, 1♀; altitude 479 m, 1♂); Popçisht (906 m, 2007, 1♀ and 1♂). **Ersekë:** Qafëzezë (837 m, 2007,

1♂). **Pogradec:** Golik (462 m, 2007, 1♂); Proptisht (527 m, 2007, 1♂); Zamçë (768 m, 2007, 1♀); Vërri (572 m, 2007, 2♀). **Sarandë:** Saranda (May 1958; Macholán et al., 2003).

Mus musculus has already been reported in Albania by Vangjeli (1987b) and Bego (1997). As shown by Macholán *et al.* (2003), the Albanian house mice from Tirana, Qeparo and Saranda belong to the western long-tailed group, which is frequently considered an independent species, *Mus domesticus* (cf. Wilson and Reeder, 2005). Vangjeli (1987b) reported both taxa (as subspecies *M. m. musculus* and *M. m. domesticus*) for the agricultural areas of Korça but her material possibly included also *M. macedonicus*. Based on our collections, *M. musculus* is probably widespread in rural and sub-rural areas of Albania, as a sinanthropic species, whilst free-living populations mostly belong to *M. macedonicus*. Accordingly, in extensive owl-pellet material from the coastal sites of Xeng and Karavasta, collected between 2000 and 2008, we identified only 10 specimens of *M. musculus*. Commensal house mice were found up to c. 1200 m a.s.l. (Fig. 14).

Mus macedonicus Petrov and Ružić, 1983

Lushnjë: Divjaka pine forest (1995, 1♂; 2007, 1♀); Xeng (at Shën Kolli monastery, 5 m) and Karavasta (at Shën Thanasi monastery, sea level), 350 specimens from pellets during 2000-2008; Bishqethëm (0-5 m, at Shën Mari monastery, January and April 2008, c. 133 specimens from pellets). **Delvinë:** Messopotami (50 m, 1996, 2006 and 2007, 45 specimens from pellets); Vurg (0-10 m, 2006, 6 specimens from pellets); Kalasë (40 m, 2006, 4 specimens from pellets). **Fier:** Apolloni (Pojan, altitude 0-30 m, 1998, 3 specimens from pellets); Vajkan, Shën Kolli Monastery (0-20 m, January and April 2008, 19 specimens from pellets). **Gjirokastër:** Bodrishtë (430 m), Antigone (210 m), Libohovë (350 m), and Lazarat (350 m), c. 74 specimens from pellets during 2004-2007.

Mus macedonicus is the most common out-door *Mus* species in Albania (Fig. 15). Based on the disitribution of our records it is seemingly restricted to the coastal lowlands of central and southern Albania. In the districts of Lushnjë and Fier *M. macedonicus* it is evidently sympatric with the morphologically and ecologically similar *M. spicilegus*. Based on owl pellet content the former is by far more abundant (483 vs. 88 specimens in the district of Lushnjë).

Mus spicilegus Petenyi, 1882

Durrës: Rrushkulli (1992, close to sea level, 1 ♂). **Lushnjë:** Xeng (at Shën Kolli monastery, altitude 5m) and Karavasta (at Shën Thanasi monastery, close to sea level), 84 specimens from pellets in 2000-2008; Bishqethëm (0-5 m, at Shën Mari monastery, January and April 2008, 4 specimens from pellets). **Fier:** Darzezë (at Shën e Premte monastery, 2002, sea level, 3 specimens from pellets); Vajkan (0-20m, 2008, at Shën Kolli monastery, 8 specimens from pellets).

Considering the current known range of *M. spicilegus* in the south-western Balkans (Macholán and Vohralík, 1997; Kryštufek and Macholán, 1998), the species is putatively widespread along the coast, from Shkodra to Vlora (Fig.16). Its sympatry with *M. macedonicus* requires further attention.

The first record for Albania is based on the re-examination of specimens collected in the early 1960s (Macholán and Vohralík, 1997). An overlooked report of *Mus spicilegus spicilegus* from north Albania by Miller (1912) requires verification.

Micromys minutus (Pallas, 1771)

Fier: Darzezë, Shën e Premte Monastery (close to sea level, 2002, 1 specimen from pellets). **Lushnjë:** Xeng, Shën Kolli Monastery (5 m, 2004 and 2007, 3 specimens from pellets); Karavasta, Shën Thanasi Monastery (close to sea level, February 2008, 1 specimen from pellets); Bishqethëm, Shën Mari Monastery (0-5 m, January and April 2008, 5 specimens from pellets). **Gjirokastër:** Gjirokastra (2005, 1 specimen from pellets).

Eleven specimens of the harvest mouse, found in *T. alba* pellets, are the first evidence of this species in Albania. Four out of five localities are situated in the Lushnja and Fieri districts, in the central part of the coastal lowlands, where the last preserved remnants of formerly extensive marshlands are still found (Fig. 17). The most southerly location (Gjirokastra district) consists of scattered patches of *Salix*, *Typha* and *Phragmites* along the River Drinos. The harvest mouse is possibly more widespread in the coastal belt; given its presence in Montenegro (Petrov, 1992), it certainly occurs also around the Shkodra Lake.

Rattus rattus (Linnaeus, 1758)

Kukës: Bicaj (501 m, 2006 and 2007, 3♂ and 1♀). **Has:** Tobël (534 m, 2006, 2♂); Sefoll (539 m, 2006, 1♂). **Pukë:** Mehaj (806 m, 2006, 1♂). **Tiranë:** Tirana city (100 m, 2♀ and 1♂: Bajrami and Serezi, 1981). **Gramsh:** Çekrezë (219 m, 2006, 1♂). **Skrapar:** Bogovë (239 m, 2006, 1♂). **Tepelenë:** Zharrë (202 m, 2006, 1♂). **Gjirokastër:** Lazarat (350 m, 2006, 1 specimen from pellets); Bodrishte (430 m, 2006, 2 specimens from pellets); Lazarat (481 m, 2007, 1♀); Cfakë (323 m, 2007, 1♀). **Lushnjë:** Karavasta, Shën Thanasi Monastery) (near the sea level), and Xeng, Shën Kolli Monastery (5 m, 2000-2008, c. 9 specimens from pellets); Divjaka Pine Forest (sea level, 2007, 1♂); Bishqethëm, Shën Mari Monastery (0-5 m, 2008, 3 specimens from pellets). **Fier:** Darzezë, Shën e Premte Monastery) (near the sea level, 2002, 7 specimens from pellets); Vajkan, Shën Koll Monastery (0-20 m, 2008, 1 specimen from pellets). **Korçë:** Maliqfshat (823 m, 2007, 2♀); Plovisht (804 m, 2007, 1♂). **Pogradec:** Piskupat (699 m, 2007, 1♂); Dardhas (1032 m, 2007, 2♀). **Ersekë:** Shtikë (1171 m, 2007, 2♀ and 2♂).

Rattus rattus has been reported for Albania since the early 1950s by various authors (Rosický and Gjini, 1960; Vangjeli, 1987b; Bajrami and Serezi 1981). Based on our sampling, the black rat is quite widespread and common in rural and suburban areas throughout the country, from sea level up to 1200 m a.s.l. (Fig. 18). Vangjeli (1987b) reported black rats from the agricultural area of Korça.

Rattus norvegicus Berkenhout, 1769

Sarandë: Butrint (3 m, 2006, 3 ♂); Sarandë-qytet (2007, 1♂). **Shkodër:** Shkodër-qytet (2007, 1♂). **Lezhë:** Kune (sea level, 2007, 1 ♂). **Berat:** Gjoroven (2007, 1♀). **Korçë:** Moglicë (479 and 844 m, 2007, 1♀ and 1♂); Lozhan (739 m, 2007, 1♀).

The brown rat is probably widespread throughout Albania, mainly in urban areas below 1000 m a.s.l. (Fig. 18). Our observations suggest that it dominates

over the black rat in urban areas. The species wasrecorded in Albania for the first time by Rosický and Gjini (1960).Vangjeli (1987) reported brown rats from the agricultural area of Korça.

Myodes glareolus (Schreber, 1780)

Korçë: Dardhë (1438 m, 2007, 1♀); Voskopojë (1488 mm, 2007, 1♂).

Myodes glareolus is recorded for the first time in Albania. Both localities consisted of high altitude, dense, mixed forest of beech, fir and pine, with well developed understory (Fig. 19). The bank vole might be widespread in the mountainous forests of eastern and northern Albania, which putatively represent the southern border of its range (cf. Mitchell-Jones *et al.*, 1999).

Microtus levis Miller, 1908

Delvinë: Messopotami (50 m, 1996, 3 specimens from pellets); Kalasë (40 m, 2006, 1 specimen from pellets). **Fier:** Apolloni, Pojan (1998, 14 specimens from pellets). **Gjirokastër:** Gjirokastra (2004, 1 specimen from pellets).

Considering the ranges of the two sibling *Microtus* species in eastern Macedonia (Petrov, 1992) and adjacent Greece (Sofianidou and Vohralík, 1991), the material collected in Albania (Fig. 19) belong to *M. levis*, rather than to *M. arvalis*. Karyotype evidence however is required to unambiguously ascertain their taxonomic identity. Vangjeli (1987a) was the first to report *M. levis* (as *M. epiroticus*) for Albania, specifically for the Korça agricultural area.

Microtus felteni Malec and Storch, 1963

Delvinë: Messopotami (50 m, 1996, 2006 and 2007); Kalasë (40 m, 2006), and Vurg (0-10 m, 2006, 22 specimens from pellets). **Gjirokastër:** Castle (520 m), Antigone (210 m), Lazarat (350 m), Bodrishtë (430 m), and Libohovë (230 m), c. 9 specimens from pellets during 2006-2007. **Pogradec:** Dardhas (1188 m, October 2007, 1♀). **Vlorë:** Llogora (1050 m, May 1958, 2 specimens; Anděra, 1991).

The Balkan pine vole is a rare and little known Balkan endemic. It has been observed in only 13 localities (Kryštufek and Petkovski, 2003) but its potential range might cover an area of c. 40,000 km^2 in Albania, Serbia, Kosovo, Macedonia, and Greece (Shenbrot and Krassnov, 2005). Our collection includes at least 31 specimens found in pellets and a pregnant female (with six embryos) captured in a small clearing inside mixed deciduous woodland in Pogradeci district (Fig. 20).

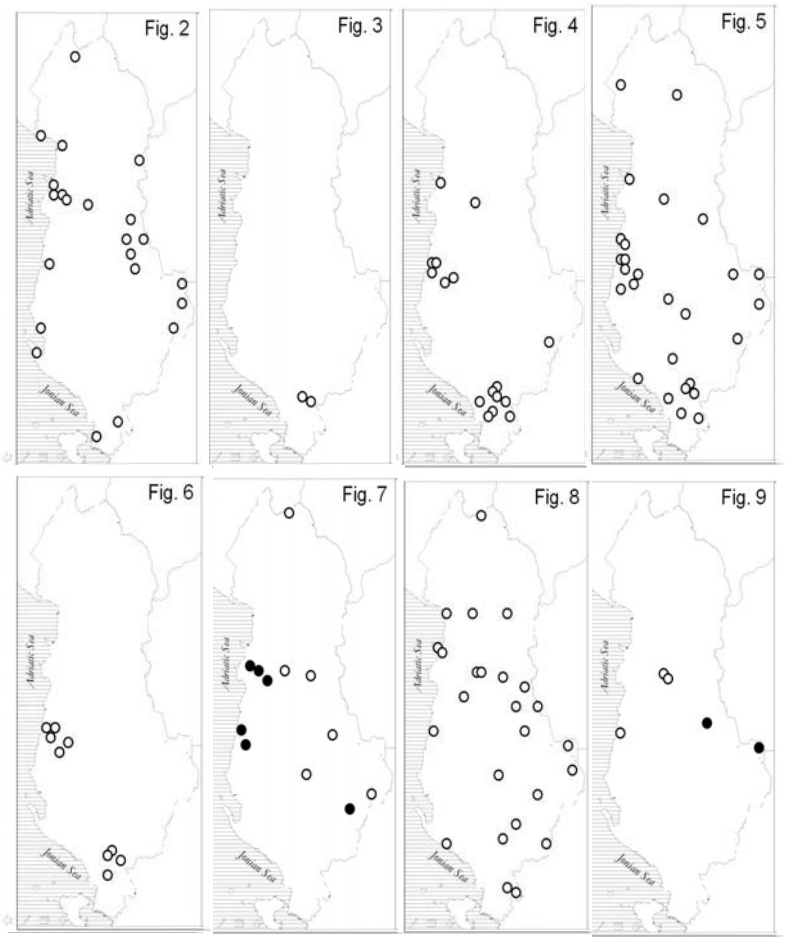
Microtus thomasi (Barrett-Hamilton, 1903)

Delvinë: Messopotami (50 m, 1996, 2006 and 2007, 111 specimens from pellets); Kalasë (40 m, 2006, 51 specimens from pellets); Vurg (0-10 m, 2006, 5 specimens from pellets). **Fier:** Apolloni, Pojan (0-30 m, 1998, 42 specimens from pellets); Darzezë, Shën e Premte Monastery (close to sea level, 2002, 26 specimens from pellets); Vajkan, Shën Koll Monastery (0-20 m, 2008, 292 specimens from pellets). **Lushnjë:** Xeng, Shën Kolli Monastery, and Karavasta, Shën Thanasi Monastery (2001-2008, c. 188 specimens from pellets); Bishqethëm, Shën Mari Monastery (0-5 m, January and April 2008, 85 specimens from pellets). **Gjirokastër:** Gjirokastra Castle (520 m), Antigone (210 m), Lazarat (350 m), Libohovë (230 m), and Bodrishtë (430 m), c. 130 specimens from pellets during 2005-2007.

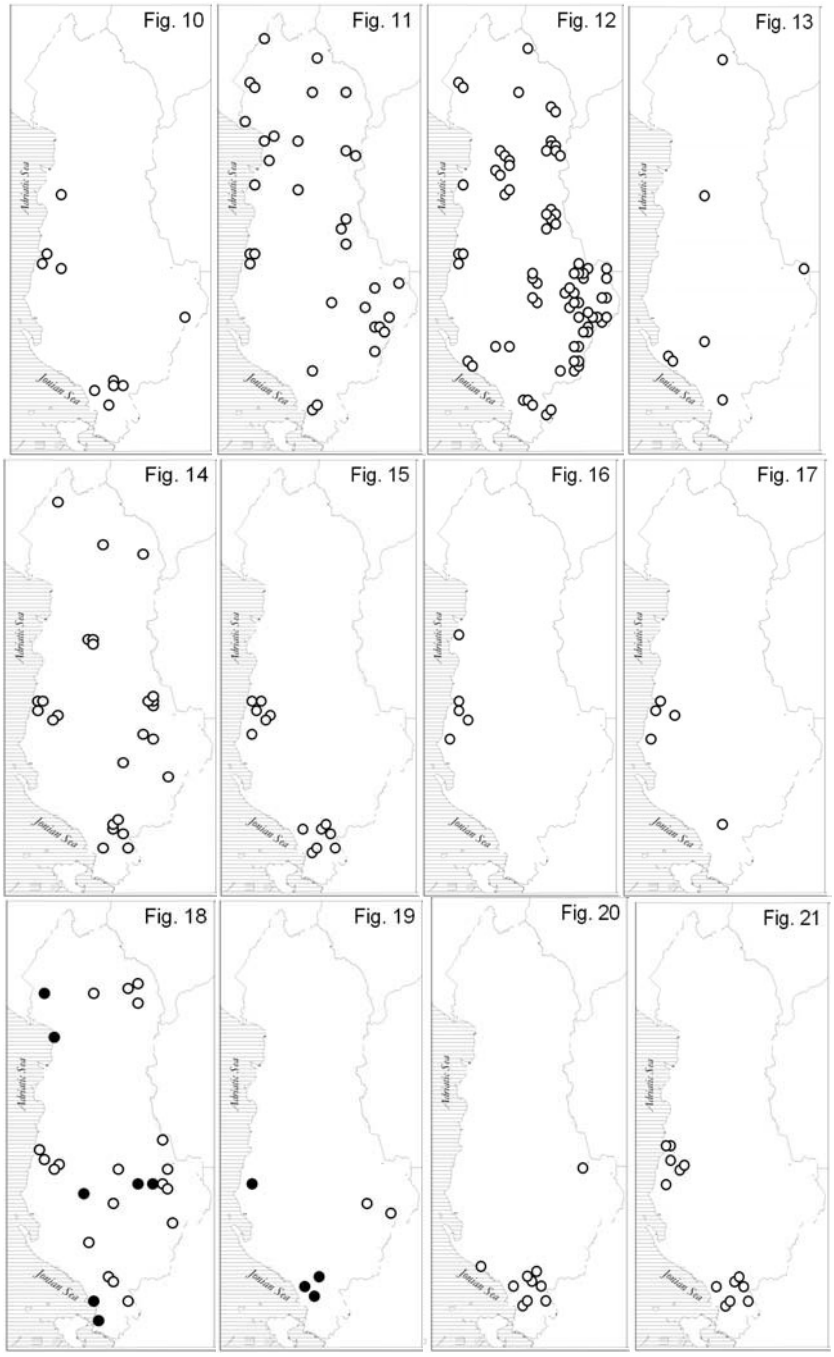
In Albania, Thomas' pine vole is the most common vole in the diet of *Tyto alba* and our collection includes 911 specimens. Although all our records are from the coastal lowlands (Fig. 21), we assume that Thomas' pine vole is probably more widespread at low and medium altitudes (cf. Shenbrot and Krasnov, 2005).

DISCUSSION

We report the occurrence of 24 species of small terrestrial mammals in Albania. The present list is far from being complete and the presence of a further 11 species is beyond doubt: four shrews (*Sorex araneus*, *S. minutus, S. alpinus,* and *Neomys fodiens*), one mole (*Talpa europaea*) and six rodents (*Dinaromys bogdanovi, Microtus arvalis, Microtus subterraneus, Chionomys nivalis, Arvicola amphibius*, and *Spalax leucodon*). The four shrews and at least four rodents (*D. bogdnovi, M. arvalis, M. subterraneus* and *C. nivalis*) are known from



Figures 2 - 9. Small mammals records in Albania. 2-*E. romanicus,* 3-*N. anomalus,* 4-*C. leucodon,* 5-*C. suaveolens,* 6-*S. etruscus,* 7-*T. caeca* (circles) and *T. stankovici* (dots), 8-*S. vulgaris,* 9-*G. glis* (circles) and *D. nitedula* (dots).



Figures 10 - 21. Small mammals records in Albania: 10-*M. avellanarius,* 11-*A. sylvaticus,* 12-*A. flavicollis,* 13-*A. epimelas,* 14-*M. musculus,* 15-*M. macedonicus,* 16-*M. spicilegus,* 17-*M. minutus,* 18-*R. rattus* (circles) and *R. norvegicus* (dots), 19-*M. glareolus* (circles) and *M. levis* (dots), 20-*M. felteni,* 21-*M. thomasi*.

mesic habitats in the mountains along the border between Albania and Montenegro (e.g. Mt. Komovi), Kosovo (Mt. Žljeb) and Macedonia (Mt. Šara, Mt. Jablanica; Petrov, 1992, own unpublished data). The water vole (*A. amphibius*) has been recorded around two lakes shared between Albania and Montenegro (Lake Shkodra) and Macedonia (Lake Ohrid; Petrov, 1992). Habitat degradation increases aridity in forests (McCay and Komoroski, 2004). The overexploitation of a considerable proportion of woodland in Albania might partially explain the absence in our samples of red-toothed shrews, a group known to be sensitive to humidity (MacCracken *et al.*, 1985). *S. leucodon* has probably been unrecorded for the lack of adequate sampling methods. It is also noteworthy that nine of the species listed above are close to the southern borders of their distribution in Macedonia or northern Greece (Mitchell-Jones *et al.*, 1999), and thus are likely to be quite rare in Albania. In any case, *T. europaea* and *M. arvalis* are presumably present in the mountains north of the River Drin. Eight species (the four shrews, *D. bogdanovi, M. subterraneus, C. nivalis* and *S. leucodon*) can be expected to occur in the mountainous habitats of northern and eastern Albania, therefore future field sampling should focus on these regions.

The taxonomic identification of our material was based on morphology. Although such an approach provides reliable results for the great majority of the taxa listed above, in some cases (e.g. genus *Talpa* and *Microtus arvalis-levis* group) our results need to be strengthened by karyological studies. Furthermore, in the Balkans several taxa display chromosomal variation, although they are still listed under one binominal. For example *M. thomasi*, a vole endemic to the western Balkans, consists of several allopatric cytotypes of unknown taxonomic status (Zima, 2004). Although chromosomal variability is perhaps not indicative of cryptic speciation, it reveals the phylogeographic structuring of a small-range endemism. The Balkan Peninsula was one of the major refugia from European glaciation over the last two million years of climatic oscillations. Unsurprisingly, given the high topographic diversity of the region, phylogeographic studies based on molecular markers have revealed many microrefugia within the major refugium (e.g. Krystufek *et al.*, 2007). The role played by Albania as a refugium is still mostly unknown.

Finally, it must be stressed that there are major conservation issues associated with Albania. The number of extinctions strongly correlates with the number of endemisms, the species which display both restricted ranges and low densities suffering the highest risk of extinction (Nott and Pimm 1997). All mammalian species endemic to the Balkans should receive the greatest attention with respect to conservation and research. Throughout the Balkans and Albania in particular the reality of conservation issues sharply contrasts with these requirements. The recent decline of the Mt. Galičica population of *D. bogdanovi*, a western Balkans endemic, is representative of a wider situation (Kryštufek and Bužan, 2008). The formal verification of its presence in Albania would lay the basis for indispensable conservation actions.

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