

Results of the pioneer survey of potential bat hibernacula in Albania (2012–2015)

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Abstract. For the first time at a national scale in Albania, a winter bat population census in potential hibernacula has been implemented during the four winters (early 2012, 2012/2013, 2013/2014 and 2014/15). 178 potential hibernation sites have been visited. During the visits of natural caves, bunkers, tunnels, buildings and mines we recorded at least 9 bat species: *Rhinolophus ferrumequinum* (28 sites), *R. hipposideros* (36 sites), *R. blasii* (1 site), *R. euryale* (3 sites), *Myotis myotis/oxygnatus (blythii)* (4 sites), *M. capaccinii* (6 sites), *Pipistrellus* sp. (2 sites), *Hypsugo savii* (1 site) and *Miniopterus schreibersii* (9 sites). The data presented are substantial additions to knowledge on the distribution of these species and their roosts in Albania, and will form a basis for bat population monitoring and, at the same time, for improving conservation measures in Albania and the wider region.

Key words: Albania, bats, Chiroptera, hibernacula, monitoring, survey

Izveček. Rezultati prvih popisov možnih prezimovališč netopirjev v Albaniji (2012-2015) – V štirih zimah (začetek 2012, 2012/2013, 2013/2014 in 014/15) je bil v Albaniji prvič na državnem nivoju opravljen popis prezimujočih netopirjev. Pregledanih je bilo 178 možnih prezimovališč. Med obiski naravnih jam, bunkerjev, tunelov, zgradb in rudnikov je bilo opaženih najmanj 9 vrst netopirjev: *Rhinolophus ferrumequinum* (28 lokacij), *R. hipposideros* (36 lokacij), *R. blasii* (1 lokacija), *R. euryale* (3 lokacije), *Myotis myotis/oxygnatus (blythii)* (4 lokacije), *M. capaccinii* (6 lokacij), *Pipistrellus* sp. (2 lokaciji), *Hypsugo savii* (1 lokacija) in *Miniopterus schreibersii* (9 lokacij). Predstavljeni rezultati v veliki meri prispevajo k poznavanju razširjenosti teh vrst in njihovih zatočišč v Albaniji ter bodo osnova za monitoring populacij netopirjev in za izboljšanje ohranitvenih ukrepov tako v Albaniji kot v širši regiji.

Ključne besede: Albanija, netopirji, Chiroptera, prezimovališča, monitoring, raziskava

Introduction

Since the first data on bats collected in Albania a century ago, with a female *P. auritus* caught in 1914 (Spitzenberger et al. 2001), surveys on bats in Albania have been organised during spring, summer or autumn (Hanak et al. 1961, Hurka 1962, Hanak 1964, Lamani 1970, Bego & Griffiths 1994, Chytil & Vlašin 1994, Uhrin et al. 1996, Sachanowicz & Ciechanowski 2006, Sachanowicz et al. 2006, Schieffler et al. 2013, Théou & Bego 2013). Thanks to all these surveys carried out mostly by foreign researchers, 32 bat species were confirmed to occur in Albania (Bego & Théou 2014). With the exception of three records concerning *R. hipposideros*, *M. capaccinii* and *Plecotus* sp., coming from bat surveys of a few caves around Lake Prespa in February 2011 (Papadatou et al. 2011), no other winter data on bats had been collected in this country, even though there are numerous potential bat hibernacula, e.g. thousands of caves and hundreds of former military buildings (Théou 2014). In 2012, a pilot bat monitoring programme focusing on bunkers around Tirana was started by Théou & Bego (2014), and since then at least a few hibernacula have regularly been monitored for the first time in Albania. Even at the scale of wider region, the lack of knowledge about bat hibernacula is apparent, with rare winter observations available for Bosnia and Herzegovina (Pašić et al. 2013), Montenegro (Prešetnik et al. 2014), Macedonia (Kryštufek et al. 1992) and Greece (Papadatou et al. 2011). Nevertheless, winter data on bats and their roosts are key elements to understand the bat species conservation status and for implementing a successful management at local and regional level (Dietz et al. 2009). Therefore we hope that the reported results of bat winter surveys in Albania have improved the knowledge on bats not only for Albania, but for the neighbouring countries as well, contributing to the clearer status overview for the south-west Balkan area.

Material and methods

Surveys were organized between mid-November and end of February, spanning four winters (early 2012, 2012/2013, 2013/14 and 2014/15) in several parts of Albania (Fig. 1). In these areas, as in most of Albania, winters are known to be severe, with possible important snow covering, and long period of low temperatures. For some of these areas, annual monitoring programs have been on-going. In general, one visit per winter has been implemented for most of the sites. Natural caves (horizontal and pits) but also bunkers, tunnels, buildings (church, castle, private house, school) and mines were visited in order to identify possible bat hibernacula. These sites have been selected following previous surveys during spring or summer, but several sites have been randomly visited following indications on presence of bats by local inhabitants. For each site visited, the geographic latitude and longitude coordinates were recorded. Bats were counted visually thanks to head lamps and determined down to the species level when possible or attributed to higher taxon following Dietz et al. (2009). In some cases bat detectors (D1000X Petterson Elektronik AB, Sweden) were used at the site to record any bat ultrasound calls, which were eventually analysed with Bat Sound, v4.1 programme (Petterson Elektronik AB, Sweden) and calls identified according to Barataud (2014). When larger bat groups were encountered, pictures were taken and the

number of individuals of each species determined later on the computer. During all surveys, a strict protocol was implemented in order to limit the disturbance of bats with, for example, a limited number of persons checking the roosts to avoid making any noise. No bats were manipulated by hand for direct measurements.

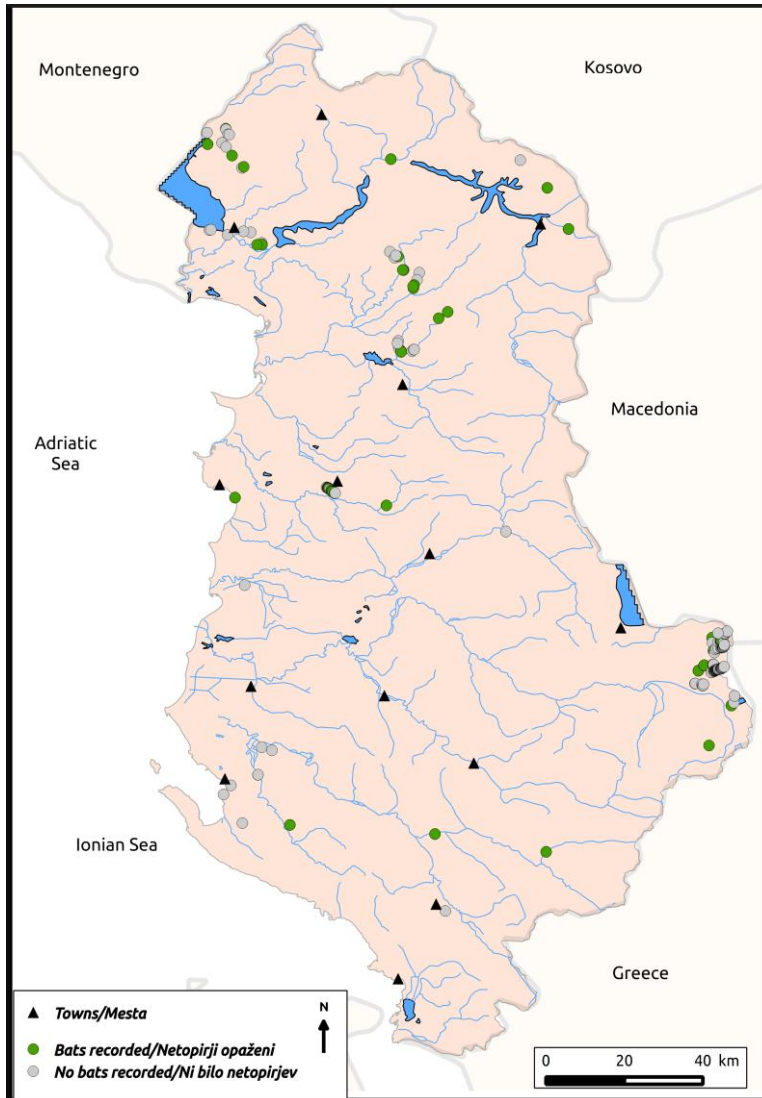


Figure 1. Potential bat hibernacula visited in Albania in winters from early 2012 to 2014/2015.

Slika 1. Možna prezimovališča netopirjev v Albaniji v zimah od začetka 2012 do 2014/2015.

Results and discussion

General results

In total, 178 potential bat hibernacula have been visited in Albania (Fig. 1), and 245 visits made thanks to the implementation of monitoring protocols (Tab. 1).

Table 1. Number of potential bat hibernacula in Albania visited each winter, from early 2012 to 2014/2015. Numbers in brackets refer to sites visited for the first time in that winter.

Tabela 1. Število potencialnih prezimovališč v Albaniji, obiskanih na zimo, od začetka 2012 do 2014/2015. Števila v oklepaju so lokalitete, ki smo jih prvič obiskali tisto zimo.

Winter	Number of potential bat hibernacula visited (first visit)
Early 2012	1 (1)
2012/13	75 (75)
2013/14	72 (44)
2014/15	77 (58)

Of the 178 sites, 114 were caves, 28 bunkers, 22 tunnels, 9 buildings and 5 mines. In 51 (28%) of these sites (27 caves, 8 bunkers, 14 tunnels, 1 building and 1 mine, Tab. 2) at least 9 bat species have been observed (Tab. 3). A maximum of five species were recorded in the same hibernacula, whereas a maximum number of 2,431 individuals from three species were recorded in one site (Tab. 2). 72% of the hibernacula hosted less than 10 individuals, whereas at 15% of the sites more than 100 individuals were found. Most important bat groups composed of more than 500 individuals have been observed in 5% of the hibernacula.

Although hibernating bats were recorded in all types of sites, caves hosted the most important diversity (a maximum of 5 species) and the most numerous groups of bats (maximum of 2,431 individuals) (Tab. 2). In comparison, bunkers hosted a maximum of 4 species and 71 individuals, tunnels 4 species and 23 individuals, mines 1 species and 1 individual, buildings 1 species and 1 individual. However, despite this general observation, former military buildings and mines are interesting roosts for some bat species on a local scale, especially for hibernacula, when natural caves are missing in the area (Théou & Bego 2014), which is the case in most of the western part of Albania.

Bat species are distributed differently in Albanian hibernacula. Whereas *Rhinolophus ferrumequinum* or *R. hipposideros* have been commonly recorded in hibernacula throughout the country, not only in caves but also bunkers, buildings and mines, other species as *Miniopterus schreibersii* have been encountered only in a few caves (Tab. 2, Figs. 2, 5). This observation seems to be similar to other data collected in other countries of the region (Kryštufek et al. 1992, Papadatou et al. 2011, Pašić et al. 2013, Presetnik et al. 2014). Also, the repeated visits made within the framework of this study showed that identified roosts had been used for several years in a row, especially the roosts hosting more than 50 individuals. Small fluctuation in the number of bats using these sites have been observed, but with data collected during three winters at maximum we cannot give any reliable interpretation of potential trends. However, these results confirm the importance to establish the monitoring protocols for all hibernacula, in order to be able to observe possible changes at the local but also national scale in the future.

It is also important to underline that, contrary to other types of surveyed sites, most of the caves used during the winter were unused by bats during the spring and summer (Théou, unpublished). This aspect has to be taken in account by managers and for the redaction of future management plans, in order not to base management measures only on data collected during spring and summer. The use of several roosts during the year underlines also the importance of creating protected cave networks at a local, national and regional scale.

Table 2. Bat hibernacula found in Albanian in winters from early 2012 to 2014/2015.

Tabela 2. Prezimovališča netopirjev, najdena v Albaniji v zimah od začetka 2012 do 2014/2015.

Site code	Name (NN – the site has no designated name)	Closest village	Coordinates (WGS 84)	Type of site	Number of hibernating bat species recorded	Max. sum of individuals for one survey (winter years)
AL0005	Shkëmbi i Kavajës	Golem	41.27°N 19.51°E	bunker	4	36 (2013/14)
AL0063	NN	Lajthizë	40.77°N 20.88°E	tunnel	4	23 (2014/15)
AL0069	NN	Liqenas	40.78°N 20.90°E	tunnel	1	1 (2013/14)
AL0073	NN	Gorica e vogël	40.87°N 20.92°E	cave	2	270 (2014/15)
AL0080	NN	Gollomboç	40.83°N 20.93°E	cave	4	4 (2014/15)
AL0108	NN	Zaroshkë	40.77°N 20.94°E	cave	1	4 (2014/15)
AL0113	NN	Zaroshkë	40.77°N 20.94°E	cave	1	1 (2013/14)
AL0129	NN	Kallamas	40.87°N 20.94°E	cave	1	1 (2014/15)
AL0145	NN	Gollomboç	40.86°N 20.95°E	cave	1	2 (2013/14)
AL0146	NN	Gollomboç	40.86°N 20.95°E	cave	1	1 (2012/13)
AL0159	NN	Gollomboç	40.85°N 20.95°E	cave	3	3 (2012/13)
AL0171	NN	Gollomboç	40.84°N 20.96°E	cave	1	4 (2013/14)
AL0203	Treni cave	Treni	40.67°N 20.98°E	cave	5	108 (2013/14)
AL0205	NN	Shueç	40.70°N 20.99°E	tunnel	1	1 (2012/13)
AL0270	Zef Toma cave	Bajzë	42.31°N 19.43°E	cave	3	14 (2014/15)
AL0282	NN	Juban	42.01°N 19.58°E	bunker	1	70 (2014/15)
AL0285	Ali Dedes cave	Juban	42.01°N 19.59°E	cave	1	7 (2014/15)
AL0293	Velce cave	Velce	40.32°N 19.67°E	cave	5	313 (2014/15)
AL0303	NN	Tirana	41.30°N 19.78°E	bunker	1	1 (2012/13)
AL0306	NN	Tirana	41.30°N 19.78°E	bunker	1	3 (2013/14)
AL0308	NN	Tirana	41.30°N 19.79°E	tunnel	4	4 (2012/13)
AL0310	NN	Tirana	41.30°N 19.79°E	tunnel	1	1 (2012/13)
AL0313	NN	Tirana	41.30°N 19.79°E	bunker	2	23 (2012/13)
AL0314	NN	Tirana	41.30°N 19.79°E	tunnel	2	3 (2012/13)
AL0318	NN	Tirana	41.30°N 19.79°E	tunnel	1	1 (2012/13)
AL0321	NN	Tirana	41.29°N 19.79°E	tunnel	1	1 (2013/14)
AL0322	NN	Tirana	41.29°N 19.80°E	bunker	2	3 (2013/14)
AL0325	NN	Tirana	41.30°N 19.80°E	tunnel	1	2 (2013/14)
AL0326	NN	Tirana	41.30°N 19.80°E	tunnel	3	9 (2013/14)
AL0327	NN	Tirana	41.29°N 19.80°E	tunnel	2	8 (2012/13)
AL0330	NN	Tirana	41.29°N 19.80°E	tunnel	1	1 (2013/14)
AL0334	NN	Tirana	41.29°N 19.81°E	tunnel	2	6 (2012/13)
AL0341	Black cave	Ibë	41.25°N 19.96°E	cave	1	79 (2011/12)
AL0347	Keputes cave	Urakë	41.70°N 20.00°E	cave	3	563 (2013/14)
AL0348	Blazi cave	Urakë	41.70°N 20.00°E	cave	2	619 (2014/15)

Site code	Name (NN – the site has no designated name)	Closest village	Coordinates (WGS 84)	Type of site	Number of hibernating bat species recorded	Max. sum of individuals for one survey (winter years)
AL0363	NN	Luadh	40.29°N 20.10°E	cave	3	8 (2014/15)
AL0392	Bat cave	Kishaj	42.18°N 20.44°E	cave	3	2431 (2014/15)
AL0397	Jezim cave	Belje	42.06°N 20.50°E	cave	4	486 (2014/15)
AL0411	NN	Benjë	40.24°N 20.43°E	cave	3	125 (2014/15)
AL0413	NN	Ziçisht	40.55°N 20.92°E	cave	2	8 (2014/15)
AL0424	NN	Gojan	41.98°N 19.99°E	building	1	1 (2014/15)
AL0429	NN	Gjegjan	41.94°N 20.01°E	bunker	1	2 (2014/15)
AL0431	NN	Reps	41.89°N 20.04°E	cave	1	1 (2014/15)
AL0433	NN	Reps	41.89°N 20.04°E	mine	1	1 (2014/15)
AL0435	NN	Reps	41.89°N 20.04°E	tunnel	1	2 (2014/15)
AL0436	NN	Mërkurth	41.82°N 20.14°E	cave	1	12 (2014/15)
AL0437	NN	Mërkurth	41.80°N 20.11°E	cave	2	53 (2014/15)
AL0441	NN	Breglum	42.26°N 19.97°E	cave	2	7 (2014/15)
AL0487	Muriqit cave	Lukaj	42.35°N 19.48°E	cave	2	5 (2014/15)
AL0493	NN	Lohja	42.27°N 19.50°E	bunker	2	71 (2014/15)
AL0494	Gurrës cave	Qafe Gradë	42.24°N 19.54°E	cave	1	1 (2014/15)

Table 3. Bat species recorded in different types of hibernacula in Albania during winters from early 2012 to 2014/2015.

Tabela 3. Vrste netopirjev, opažene v različnih prezimovališčih v Albaniji v zimah od začetka 2012 do 2014/2015.

Species	No. of hibernacula sites (caves / bunkers / tunnels / buildings / mines)	Max. no. of bats at a site	Max. sum of bats in one winter session (winter census year)
<i>Rhinolophus ferrumequinum</i>	28 (15/3/8/1/1)	304	413 (2014/15)
<i>Rhinolophus hipposideros</i>	36 (21/4/11/0/0)	20	62 (2014/15)
<i>Rhinolophus blasii</i>	1 (1/0/0/0/0)	254	254 (2014/15)
<i>Rhinolophus euryale</i>	3 (2/0/1/0/0)	261	262 (2014/15)
<i>Rhinolophus</i> spp. (middle sized)	10 (7/2/1/0/0)	617	1,178 (2014/15)
<i>Myotis myotis/blythii</i>	4 (3/0/1/0/0)	1	4 (2014/15)
<i>Myotis capaccinii</i>	6 (4/1/1/0/0)	100	103 (2013/14)
<i>Pipistrellus</i> sp.	2 (0/2/0/0/0)	70	140 (2014/15)
<i>Hypsugo savii</i>	1 (0/1/0/0/0)	1	1 (2014/15)
<i>Miniopterus schreibersii</i>	9 (7/1/1/0/0)	2,409	2,666 (2014/15)

Four years of winter surveys and monitoring of selected sites have substantially increased the knowledge on several bat species in Albania, and in the south-west Balkan region in general. This is the case for the usual cave-dwelling species and also for bat species that are not often found in Albania during spring or summer, as they are using, during these particular periods, human-made habitats that have till recently been surveyed to a lesser extent in the country (as *R. ferrumequinum* and *R. hipposideros*). Winter represents an interesting period for the survey of such species, as they can be observed often in caves, bunkers and tunnels. This study, however, represents only a start and the results provided herewith should be used as a base for planning research in the next years in the country. The search for new hibernacula should be intensified and monitoring network expanded according to new knowledge. Regular monitoring of a large number of sites will enable us to follow the trends in bats population size and status of habitats in Albania. Such data can easily be incorporated into regional and European bat population monitoring protocols (Van der Meij et al. 2015).

Species part

***Rhinolophus ferrumequinum* (Schreber, 1774)**

Most of the 34 observations in the 28 hibernacula concern only a few individuals (Fig. 2a). 35% of the records are solitary individuals, whereas 68% of the data are from sites hosting less than 5 individuals. Sites with more than 10 individuals represent 9% of all the hibernacula identified. One cave hibernaculum (site AL0397) hosted 74% of all the *R. ferrumequinum* recorded during the winter 2014-2015.

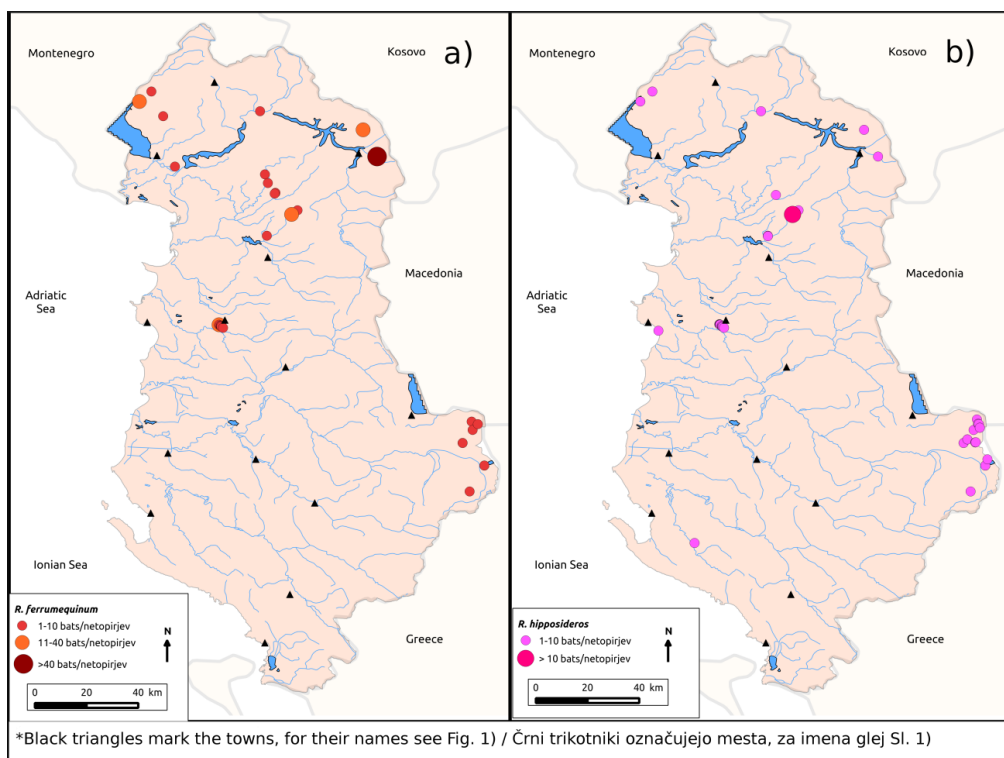


Figure 2. Hibernation sites of a) *Rhinolophus ferrumequinum* and b) *R. hipposideros* in Albania in winters from early 2012 to 2014/2015.

Slika 2. Lokalitete prezimovališč vrst a) *Rhinolophus ferrumequinum* in b) *R. hipposideros* v Albaniji v zimah od začetka 2012 do 2014/2015.

Observations (ex. is used as abbreviation for individual(s)): – AL0063: 23.2.2014, 6 ex.; 13.11.2014, 6 ex. – AL0073: 12.11.2014, 9 ex. – AL0080: 22.2.2014, 1 ex. – AL0159: 24.11.2012, 1 ex. – AL0203: 1.2.2013, 4 ex.; 21.2.2014, 1 ex.; 13.11.2014, 4 ex. – AL0270: 29.1.2015, 12 ex. – AL0285: 27.1.2015, 7 ex. – AL0313: 16.2.2013, 22 ex. – AL0314: 16.2.2013, 1 ex. – AL0318: 16.2.2013, 1 ex. – AL0322: 16.2.2013, 1 ex.; 7.12.2013, 2 ex. – AL0325: 16.2.2013, 2 ex.; 7.12.2013, 2 ex. – AL0326: 16.2.2013, 3 ex.; 7.12.2013, 5 ex. – AL0327: 16.2.2013, 7 ex. – AL0334: 16.2.2013, 2 ex. – AL0347: 12.12.2013, 1 ex. – AL0392: 12.12.2014, 18 ex. – AL0397: 13.12.2014, 304 ex. – AL0413: 13.11.2014, 2 ex. – AL0424: 9.12.2014, 1 ex. – AL0429: 9.12.2014, 2 ex. – AL0433: 10.12.2014, 1 ex. – AL0435: 10.12.2014, 2 ex. – AL0436: 11.12.2014, 9 ex. – AL0437: 11.12.2014, 33 ex. – AL0441: 12.12.2014, 1 ex. – AL0487: 28.1.2015, 1 ex. – AL0494: 30.1.2015, 1 ex. – AL0494: 30.1.2015, 1 ex.

***Rhinolophus hipposideros* (Bechstein, 1800)**

Most of the 51 observations in the 36 hibernacula identified for this species concern only few individuals (Fig. 2b). 37% of the records are solitary individuals, whereas 86% of the records are from sites hosting less than 5 individuals. Only one cave site (AL0437) hosted more than 10 individuals (2%).

Observations (ex. is used as abbreviation for individual(s)): – AL0005: 3.2.2014, 2 ex. – AL0063: 23.2.2014, 5 ex.; 13.11.2014, 3 ex. – AL0069: 3.3.2013, 1 ex.; 22.2.2014, 1 ex. – AL0080: 22.2.2014, 2 ex. – AL0108: 3.2.2013, 1 ex.; 22.2.2014, 2 ex.; 11.11.2014, 4 ex. – AL0113: 22.2.2014, 1 ex. – AL0129: 12.11.2014, 1 ex. – AL0145: 22.2.2014, 2 ex. – AL0146: 2.2.2013, 1 ex. – AL0159: 24.11.2012, 2 ex. – AL0171: 2.2.2013, 4 ex.; 22.2.2014, 4 ex. – AL0203: 24.11.2012, 7 ex.; 1.2.2013, 2 ex.; 21.2.2014, 5 ex.; 13.11.2014, 4 ex. – AL0205: 3.2.2013, 1 ex. – AL0270: 29.1.2015, 1 ex. – AL0293: 6.12.2014, 1 ex. – AL0306: 16.2.2013, 1 ex.; 7.12.2013, 3 ex. – AL0308: 16.2.2013, 2 ex.; 7.12.2013, 3 ex. – AL0310: 16.2.2013, 1 ex. – AL0313: 16.2.2013, 1 ex. – AL0314: 16.2.2013, 2 ex.; 7.12.2013, 1 ex. – AL0321: 7.12.2013, 1 ex. – AL0322: 7.12.2013, 1 ex. – AL0326: 16.2.2013, 2 ex.; 7.12.2013, 3 ex. – AL0327: 16.2.2013, 1 ex.; 7.12.2013, 1 ex. – AL0330: 7.12.2013, 1 ex. – AL0334: 16.2.2013, 4 ex. – AL0347: 12.12.2013, 1 ex. – AL0348: 12.12.2013, 2 ex.; 11.12.2014, 2 ex. – AL0392: 12.12.2014, 4 ex. – AL0397: 13.12.14, 2 ex. – AL0413: 13.11.2014, 6 ex. – AL0431: 10.12.2014, 1 ex. – AL0436: 11.12.2014, 3 ex. – AL0437: 11.12.2014, 20 ex. – AL0441: 12.12.2014, 6 ex. – AL0487: 28.1.2015, 4 ex.

***Rhinolophus* spp. (middle sized)**

During the surveys, it was sometimes possible to identify bats as *Rhinolophus euryale* (Blasius, 1853) or *Rhinolophus blasii* (Peters, 1866), using bat-detectors and/or pictures. At most of the sites, however, the identification was possible just down to the taxon *Rhinolophus* of middle size. In Albania, most of the data concerning these species come from the winter census, whereas the number of known maternity colonies is still low (Théou, unpublished). During our study, important winter groups have been recorded, sometimes with less than 200 metres between two caves hosting more than 500 individuals each (sites AL0347 and AL0348). This situation may underline the possible importance of a network of roosts used by bats, with exchanges between the two groups (Bagrowska-Urbańczyk & Urbańczyk 1983). Additionally to the above mentioned species, *Rhinolophus mehelyi* (Matschie, 1901) could also have been using the hibernacula, as this species was recently identified in the country (Bego & Théou 2014). 42% of the 19 observations concern sites with less than 10 individuals, whereas 26% of the data concern sites hosting more than 200 individuals (Fig. 3).

Observations (ex. is used as abbreviation for individual(s); *–*R. euryale*; ** –*R. blasii*): – AL0005: 3.2.2014, 28 ex. – AL0063: 23.2.2014, 8 ex.; 13.11.2014, 13 ex. – AL0073: 23.2.2014, 65 ex.; 12.11.2014, 261 ex.* – AL0159: 22.2.2014, 1 ex. – AL0203: 24.11.2012, 7 ex.; 21.2.2014, 1 ex. – AL0293: 6.12.2014, 254 ex.** – AL0303: 16.2.2013, 1 ex. – AL0326: 7.12.2013, 1 ex.* – AL0341: 19.2.2012, 79 ex.; 26.01.2014, 49 ex. – AL0347: 12.12.2013, 563 ex.; 11.12.2014, 460 ex. – AL0348: 12.12.2013, 2 ex.; 11.12.2014, 617 ex. – AL0363: 18.11.2014, 1 ex.* – AL0411: 19.11.2014, 88 ex.

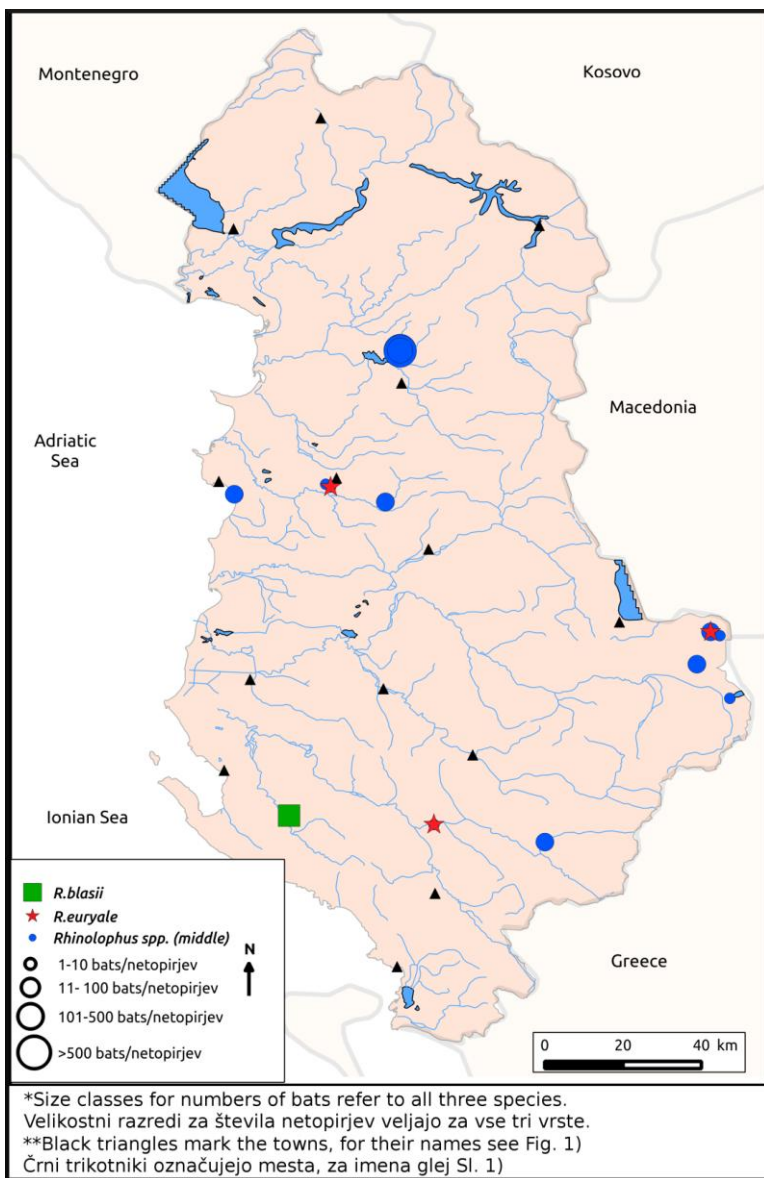


Figure 3. Hibernation sites of *Rhinolophus blasii*, *R. euryale* and undetermined middle size *Rhinolophus* spp. in Albania during winters from 2012/2013 to 2014/15.

Slika 3. Lokalitete prezimovališč *Rhinolophus blasii*, *R. euryale* in nedoločenih srednje velikih *Rhinolophus* spp. v Albaniji v zimah od 2012/2013 do 2014/2015.

Myotis myotis (Borkhausen, 1797) / *Myotis oxygnatus* (Monticelli, 1885)

The two species cannot be clearly identified without taking detailed morphological measurements. In accordance with our strict protocol and in order not to disturb animals, we have referred to those few sightings of all large *Myotis* sp. as taxon *Myotis myotis/oxygnatus*. In official documents concerning bats protection in Albania, *M. oxygnatus* is described also as *M. blythii* (Bego & Théou 2014). During spring 2014, close to 9,000 *M. myotis/oxygnatus* were recorded during surveys (direct visits of roosts) organised in the entire country and concerning all types of roosts (buildings, caves, tunnels and bunkers). During the winter surveys, however, we observed only four animals at four sites scattered across the country. The difficulty of recording these species during winter seems to be similar in the entire region (Pavlinić et al. 2010), certainly due to the possible use of crevices by individuals (Dietz et al. 2009). However, these rare observations show, at least, that these species seems to hibernate all over Albania (Fig. 4).

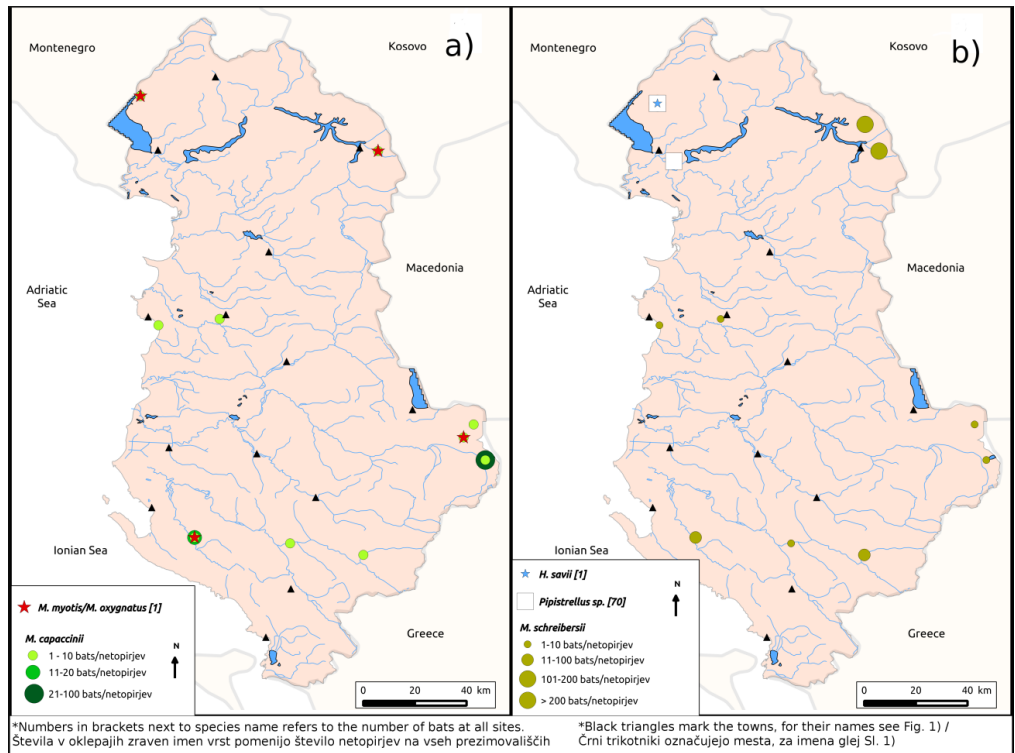


Figure 4. Hibernation sites of a) *Myotis myotis/oxygnatus* and *M. capaccinii*, b) *Hypsugo savii*, *Pipistrellus* sp. and *Miniopterus schreibersii* during winters from 2012/2013 to 2014/15.

Slika 4. Lokalitete prezimovališč vrst a) *Myotis myotis/oxygnatus* in *M. capaccinii*, b) *Hypsugo savii*, *Pipistrellus* sp. in *Miniopterus schreibersii* v Albaniji v zimah od 2012/2013 do 2014/2015.

Observations (ex. is used as abbreviation for individual(s)): – AL0063: 13.11.2014, 1 ex. – AL0293: 6.12.2014, 1 ex. – AL0397: 13.12.2014, 1 ex. – AL0270: 29.1.2015, 1 ex.

***Myotis capaccinii* (Bonaparte, 1837)**

For *Myotis capaccinii*, most of the maternity colonies are known from the area of Lake Prespa, where we have found the biggest winter congregation of the species (Fig. 4). This is concordant with Papadatou et al. (2011) data. Only mono-specific groups have been found at all these sites.

Observations (ex. is used as abbreviation for individual(s)): – AL0005: 3.2.2014, 2 ex. – AL0080: 22.2.2014, 1 ex. – AL0203: 24.11.2012, 1 ex.; 21.2.14, 100 ex.; 13.11.2014, 8 ex. – AL0293: 6.12.2014, 15 ex. – AL0308: 16.2.2013, 2 ex. – AL0411: 19.11.2014, 5 ex.

***Pipistrellus* sp.**

Considering the high possibility of wrong identification of *Pipistrellus* bats based on observations only, we considered all the individuals of this genus as *Pipistrellus* sp. It is highly likely that more than one species of this genus is hibernating in Albania, as all four species have been recorded during spring and summer (Bego & Théou 2014). The hibernating groups were recorded in the vicinity of Lake Shkodra, and underline the importance of bunkers as roosts for bats. The number of these roosts is now strongly decreasing due to illegal destructions, which represent a significant threat for several bat species in Albania (Théou & Bego 2014) (Fig. 4).

Observations (ex. is used as abbreviation for individual(s)): – AL0282: 27.1.2015, 70 ex. – AL0493: 28.1.2015, 70 ex.

***Hypsugo savii* (Bonaparte, 1837)**

The first record of this species during the winter period in Albania was made in the crevice of a bunker, where one animal was hiding among dozens of *Pipistrellus* sp. (Fig. 4). The individual was well visible, which allowed us to clearly identify it following Dietz et al. (2009). This is the first hibernaculum known for the species in the country, and the species is very likely common in the entire country (Uhrin et al. 1996). It also underlines yet again the importance of bunkers in bat conservation in Albania (Théou 2014).

Observation (ex. is used as abbreviation for individual(s)): – AL0493: 28.1.2015, 1 ex.

***Miniopterus schreibersii* (Kuhl, 1817)**

The data collected in Albania must be interpreted on a scale of the south-west Balkans. A colony in the cave (site AL0392) in the north-eastern part of the country represents the third biggest known winter group for this species in the south-west Balkans (Papadatou et al. 2011, Presetnik et al. 2014, Théou & Đurović, unpublished) (Fig. 4). However, the actual knowledge of winter roosts of this species is still unsatisfactory, especially when compared to the summer population in Albania (approximately 6,000 individuals in 2014 (Théou, unpublished data)). The main maternity colonies are located in the area of Lake Prespa. Considering the annual migratory behaviour of *M. schreibersii*, it is possible that many animals from these roosts migrate to Greek or Macedonian hibernacula. At the same time, some important hibernacula identified in north-east Albania may harbour a part of summer populations from Kosovo. The site AL0392 represents 91% of all the individuals recorded during the winter 2014/15 and

confirm the data collected in other parts of the continent, with important hibernation groups created by this species (Serra-Cobo et al. 1998).

Observations (ex. is used as abbreviation for individual(s)): – AL0005: 3.2.2014, 4 ex. – AL0080: 12.9.2014, 2 ex. – AL0203: 24.11.2012, 1 ex.; 21.2.2014, 1 ex. – AL293: 6.12.2014, 42 ex. – AL0308: 7.12.2013, 1 ex. – AL0363: 18.11.2014, 2ex. – AL0392: 12.12.2014, 2,409 ex. – AL0397: 13.12.2014, 179 ex. – AL0411: 19.11.2014, 32 ex.

Povzetek

Število zabeleženih vrst netopirjev v Albaniji se je pred kratkim povečalo na 32 (Bego & Théou 2014), predvsem zaradi ekspedicij tujih raziskovalcev, ki so potekale v obdobju več let od aprila do oktobra (Hanak et al. 1961, Hurka 1962, Hanak 1964, Lamani 1970, Bego & Griffiths 1994, Uhrin et al. 1996, Sachanowicz & Ciechanowski 2006, Sachanowicz et al. 2006, Schieffler et al. 2013, Théou & Bego 2013). Z izjemo dveh podatkov iz februarja 2011 (Papadatou et al. 2011), drugih informacij o prezimovanju netopirjev v državi ni bilo. V štirih zimah (začetek 2012, 2012/2013, 2013/2014 in 2014/15) smo skupno pregledali 178 potencialnih prezimovališč in odkrili 51 dejanskih prezimovališč netopirjev (27 jam, 8 bunkerjev, 14 tunelov, en rudnik in eno zgradbo). Potrdili smo prezimovanje vsaj devetih vrst netopirjev: *Rhinolophus ferrumequinum* (na 28 mestih), *R. hipposideros* (36), *R. blasii* (1), *R. euryale* (3), *Myotis myotis/oxynatus* (4), *M. capaccinii* (6), *Pipistrellus* sp. (2), *Hypsugo savii* (1) in *Miniopterus schreibersii* (9). Na posamičnem prezimovališču smo našli največ pet vrst netopirjev in največ 2.431 osebkov (treh vrst). V 72 % prezimovališč smo opazili manj kot 10 osebkov, v 15 % prezimovališč pa je prezimovalo več kot 100 osebkov. Čeprav so bili prezimujoči netopirji opaženi v vseh tipih zatočišč, je v jamah prezimovalo največ vrst, prezimovale pa so tudi največje skupine netopirjev. Izredno se je povečalo poznavanje nekaterih vrst, ki so bile v Albaniji redko najdene pomladi ali poleti, kot npr. za *R. ferrumequinum* in *R. hipposideros*. Rezultati te raziskave, ki je ena prvih, ki so jih opravili večinoma v Albaniji stanujoči raziskovalci, potrjujejo, da je v tej državi tudi pozimi mogoče najti pestro združbo netopirjev. Nekatere populacije so pomembne za širšo regijo, saj v kar nekaj prezimovališčih prezimuje več kot 300 osebkov. Zbrani podatki so pomemben korak naprej pri vključitvi Albanije v regionalno in evropsko mrežo raziskav in varstva netopirjev, a tudi za uresničevanje pravnih in praktičnih zavez za ohranitev netopirjev.

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