

NMNH, BAS

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Project

State and prospects of the Castanea sativa population in Belasitsa mountain: climate change adaptation; maintenance of biodiversity and sustainable ecosystem management.

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Report

Results of first study of biodiversity of bats (Mammalia: Chiroptera) in chestnut forests, Belasitsa Mountain

Biodiversity of bats (Mammalia: Chiroptera) in chestnut forests, Belasitsa Mountain

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1. Previous studies

Permanent frontier position (from inclusion of the region within the political boundaries of the country in 1912 up to now), and presence of strict boundary regime during the totalitarian communist period 1945-1991 are the reasons that the bat fauna of Belasitsa Mt. has not been subject of a detailed study since the start of the present one. Only one record was published from the territory of the mountain: *Pipistrellus pipistrellus* (Benda et al., 2003). The records of two species was published from the foot of the mountain: *Rhinolophus hipposideros* from the town of Petrich (Hanak & Josifov, 1959) and *Nyctalus noctula* - 2 km E from town of Petrich, without locality (Hanak & Josifov, 1959; Benda et al., 2003). This study is first attempt to investigate bat fauna of Belasitsa Mt. and obtained data are first for chestnut forests in Bulgaria.

2. Material and methods

The study covers the territory of the chestnut forests on the slopes of Belasitsa Mt., above town of Petrich, from 400 to 850m a.s.l. The field studies were carried out in the period 24.03.-11.10.2010 (20 days) in five sample plots – plots 6, 8, 13 and 25 (using mist netting and ultrasound detector) and plot 4 (accidentally found bat in flight interception trap). List of

material is presented in Appendix 1, including locality (sample plot or other locality), date, number of individuals, sex, age (previous two only for mistnetted bats), method, observer and references. All species of bats are strictly protected in Bulgaria (Biological Diversity Act: Appendix 2 & Appendix 3). The study was performed under license of Ministry of environment and waters of Republic of Bulgaria (№.193/ 01.04.2009).

The species diversity was investigated by following methods: mist netting in each of investigated points (the mist nets were exposed from sunset for about three hours over the possible flying paths in the forest), visual observations in potential roosts and use of ultrasound detector on the time expansion mode (Pettersson Ultrasound Detector D240x). The sounds were recorded automatically using the digital mist net mode (see <http://www.batmanagement.com/Ordering/batrecorders/recorder.html> or http://www.bats.org.uk/publications_download.php/540/Digital_recording_with_bat_detectors_2008.pdf), with Olympus WS-310M digital voice recorder for 30 to 120 minutes in each sample point. A total of 340 bat calls were recorded (112 of them suitable for determination) and later converted from .wma to the .wav format and analyzed by the Bat Sound software. Data for a single male *Pipistrellus pipistrellus* accidentally found in flight interception trap for study of dendrobiont insects is also included.

For every caught individual are determined species, sex, age, reproductive status and standard measurements (lengths of forearm including wrist, 5th finger excluding wrist, 3rd finger excluding wrist and weight) were taken.

The bats were determined using the keys by Dietz & von Helversen (2004), Popov & Sedefchev (2003). Ultrasound records were identified according to the papers by Parsons & Jones (2000), Barataud (2002), Russo & Jones (2002), Pfalzer & Kusch (2003), and Obrist & Boesch (2004), Pandourski (2004), Pandourski & Karaivanov (2007), Popov et al. (2005).

3. Results

After the present study and review of literature sources 9 species of bats were recorded on the study territory of Belasitsa Mt. (Table 1).

Table 1. List of established and expected species of bats in Belasitsa Mountain

ESTABLISHED SPECIES		SOURCE
Family RHINOLOPHIDAE		
1.	Lesser Horseshoe Bat <i>Rhinolophus hipposideros</i> (Bechstein, 1800)	Present study
Family VESPERTILIONIDAE		
2	Whiskered Bat <i>Myotis mystacinus</i> (Kuhl, 1817)	Present study
3	Grey Long-eared Bat <i>Plecotus austriacus</i> (Fischer, 1829)	Present study
4	Common Pipistrelle <i>Pipistrellus pipistrellus</i> (Schreber, 1774)	Benda et al., 2003, present study
5	Soprano Pipistrelle <i>Pipistrellus pygmaeus</i> (Leach, 1825)	Present study
6.	Nathusius's Pipistrelle <i>Pipistrellus nathusii</i> (Keyserling et Blasius, 1839)	Present study
7.	Particoloured Bat <i>Vespertilio murinus</i> Linnaeus, 1758	Present study
8.	Serotine Bat <i>Eptesicus serotinus</i> (Schreber, 1774)	Present study
9	Western Barbastelle <i>Barbastella barbastellus</i> (Schreber, 1774)	Present study
EXPECTED SPECIES		
	Greater Horseshoe Bat <i>Rhinolophus ferrumequinum</i> (Schreber, 1774)	Close situated localities (Benda et al., 2003)
	Greater mouse-eared bat <i>Myotis myotis</i> (Borkhausen, 1797)	Close situated localities (Benda et al., 2003)
	Lesser Mouse-Eared Bat <i>Myotis blythii</i> (Tomes, 1857)	Close situated localities (Benda et al., 2003)
	Alcathoe Whiskered Bat <i>Myotis alcathoe</i> Helversen et Heller, 2001	45 kHz sounds of <i>Myotis</i> sp. recorded during present study
	Steppe Whiskered Bat <i>Myotis aurascens</i> Kuszajkin, 1935	45 kHz sounds of <i>Myotis</i> sp. recorded during present study and close situated localities (Benda et al., 2003)
	Brandt's Bat <i>Myotis brandtii</i> (Eversmann, 1845)	45 kHz sounds of <i>Myotis</i> sp. recorded during present study and close situated localities (Benda et al., 2003)
	Long-Fingered Bat <i>Myotis capaccinii</i> (Bonaparte, 1837)	Close situated localities (Benda et al., 2003)
	Bechstein's Bat <i>Myotis bechsteinii</i> (Kuhl, 1817)	Sounds of <i>Myotis</i> sp. recorded during present study and close situated localities (Boyan Petrov in litt.)
	Natterer's Bat <i>Myotis nattereri</i> (Kuhl, 1817)	Close situated localities (Benda et al., 2003)
	Kuhl's pipistrelle <i>Pipistrellus kuhlii</i> (Kuhl, 1817)	Sounds at 38-40 kHz recorded during present study and close situated localities (Benda et al., 2003)
	Savi's Pipistrelle <i>Hypsugo savii</i> (Bonaparte, 1837)	Close situated localities (Benda et al., 2003)

Common Noctule <i>Nyctalus noctula</i> (Schreber, 1774)	Sounds recorded during present study and close situated localities (Hanak & Josifov, 1959; Benda et al., 2003)
Lesser Noctule <i>Nyctalus leisleri</i> (Kuhl, 1817)	Sounds recorded during present study and close situated localities (Benda et al., 2003)

In comparison with other Bulgarian mountains with predominantly broadleaved forests (Central Balkan Mts – 18 species (Ivanova, 1998), Eastern Rhodopes Mts. – 23 species (Ivanova & Gueorguieva, 2004), Strandzha Mts. – 17 species (Popov et al., 2005)), the number of bats in Belasitsa is relatively low. However, taking into account the following issues, the current data show relatively rich bat diversity in the studied territory of Belasitsa Mt. and that the chestnut forests are an important habitat for bat conservation in Bulgaria:

- only very small part of the chestnut forest niches and other territories in the mountain was available for study in the examined plots;
- karstic habitats and underground habitats are lacking in the studied territory, only small rocky habitats are present. As a result, cave-dwelling bats like *Miniopterus schreibersii*, *Myotis myotis*, *Myotis blythii*, medium-sized *Rhinolophus* species, *Hypsugo savii* etc. are not expected or will be rare finds;
- although some data about echolocation calls of *Myotis* species were published in the last years (Parsons & Jones 2000, Obrist & Boesch, 2004), most of them cannot be determined unambiguously (Stoycheva, 2009). In the text these records are mentioned like *Myotis* sp. The presence of expected *Myotis* species still needs confirmation.

4. Species of conservation significance

All bat species established in the studied territory have high conservation status and may be adopted for taxa with high conservation value (Table 2). Because of biological and ecological characteristics of bats, all the territory of chestnut forest and Belasitsa Mt. should be regarded as important for their conservation. Particularly important habitats are old forests, rock massifs and rivers. There is no evidence of a permanent occurrence and reproduction of *P. nathusii* on the territory of Bulgaria up to now (Benda et al., 2003). Presence of the species all over the year in the studied territory may be is an evidence of a occurrence and reproduction in Belasitsa.

Table 2. Conservation status of bat species found up to now in Belasitsa Mt.

Abbreviations used:

RDB BG: Red Data Book of Bulgaria (new edition in press).**RL IUCN:** IUCN Red List of Threatened Animals (2010)**NT** – Near threatened **LC** – Least concern**Bern:** Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) - ratified on 25.01.1999, in force for Bulgaria since 01.05.1991 (State Gazette в., – 23/1995)..**Bonn:** Convention on the Conservation of Migratory Species of Wild Animals (The Bonn Convention) - ratified on 03.08.1999, in force for the Republic of Bulgaria since 01.11.1999 (State Gazette No 16/2000).**EUROBATS:** Agreement on the Conservation of Bats in Europe - ratified by law - State Gazette No 69/1999; Promulgated in the State Gazette No 16/2000, in force since 09.12.2000.**BDA:** Biological Diversity Act (Promulgated, State Gazette No. 77/9.08.2002).

Species		Concervation status					
		RDB BG	RL IUCN	Bern	Bonn	EURO BATS	BDA
Family RHINOLOPHIDAE							
1.	Lesser Horseshoe Bat <i>(Rhinolophus hipposideros)</i>	-	NT	+	+	+	+
Family VESPERTILIONIDAE							
2.	Whiskered Bat <i>(Myotis mystacinus)</i>	-	LC	+	+	+	+
3.	Grey Long-eared Bat <i>(Plecotus austriacus)</i>	-	LC	+	+	+	+
4.	Common Pippistrelle <i>(Pipistrellus pipistrellus)</i>	-	LC	+	+	+	+
5.	Soprano Pipistrelle <i>(Pipistrellus pygmaeus)</i>		LC	+	+	+	+
6.	Nathusius's Pipistrelle <i>(Pipistrellus nathusii)</i>		LC	+	+	+	+
7.	Particoloured Bat <i>(Vespertilio murinus)</i>	-	LC	+	+	+	+
8.	Serotine Bat <i>(Eptesicus serotinus)</i>	-	LC	+	+	+	+
9.	Western Barbastelle <i>(Barbastella barbastellus)</i>	-	NT	+	+	+	+

5. Threats for bats and their habitats

The human impact represents several main threats for bats in chestnut habitats in the Belasitsa Mountain:

- Forrest cutting, especially of old forests and old trees.
- Replacement of broadleaved forest with coniferous ones; planting monocultivations.
- Road construction.

- Fires.
- Change of river and stream beds.
- Disturbance and killing of bats in the buildings (mostly because of the lack of ecological education).

6. Recommendations for conservation of bats and their habitats

The main for bat conservation in the chestnut forests is the adequate forestry practices (see Meschede 2001).

- Prohibition of forests cuttings in areas inhabited by species of conservation significance.
- Prohibition of clear cuttings or other cutting techniques which affect large territories.
- Harvesting trees in clusters. Selection or group-selection systems are the most appropriate forest management practices. In the second territories affected by cuttings no larger than 15-20m in diameter through natural processes or measures for restocking.
- To prohibit the harvesting of old trees – the holes and crevices in these trees are very important for tree-dwelling bats. Securing a network of trees that already show holes due to rotting or made by woodpeckers, cracks in the trunk, or loose bark. Distance between hole hot spots should not exceed 500 m. Developing a network of successors for above cited trees is also needed.
- Forest activities must be complied with the life cycle of bats and not implemented in the breeding season (May- August) and during hibernation (November- March).
- Prohibition against rotting wood (both standing and lying) destruction.
- Prohibition on replacement of primary forest in return for plantations.
- Prohibition of use of pesticides in forestry.
- Decreasing risk of fires as a result of human activities.
- Prohibition against all manner of buildings or road construction in areas inhabited by species of conservation significance.

The bat fauna of Belasitsa is still poorly known. More intensive research and the increase of number of data on the biology and ecology of bats in the region is important for implementation of future conservation measures. Education for forest managers, hunters

and other target groups of local people in the region is very important for bat conservation, prevention of disturbance of bats in buildings or killing bats because of superstition. The chestnut forest in Belasitsa are not isolated and because of this all management plans or ideas (management of beech forest, plans for wind turbines, watercatchments) for neighboring territories should be consistent with bat conservation in the region.

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Appendix 1. Data obtained for bats species in Belasitsa Mountain during the present study: locality (sample plot or other locality), date, number of individuals, sex, age (previous two only for mistnetted bats), method, observer and notes. Abbreviations used:

mn – mistnetting

bd – bat detector

vo – visual observation

ad. – adult

juv. – juvenile

N.S. – Nikolay Simov

A.H. – Antonia Hubancheva

B.N. – Boris Nikolov

Species	date	locality (sample plot - SP)	number of individ.	sex	age	method	observer	notes
<i>P. pipistrellus</i>	28.05.2010	SP6	1			bd	N.S.	social calls
<i>P. pipistrellus</i>	28.05.2010	SP6	1			bd	N.S.	social calls
<i>P. nathusii</i>	28.05.2010	SP6	1			bd	N.S.	social calls
<i>P. pipistrellus</i>	28.05.2010	SP6	1			bd	N.S.	social calls
<i>P. nathusii</i>	28.05.2010	SP6	1			bd	N.S.	social calls
<i>P. nathusii</i>	28.05.2010	SP6	1			bd	N.S.	social calls
<i>P. pipistrellus</i>	28.05.2010	SP6	1			bd	N.S.	
<i>P. pygmaeus</i>	30.05.2010	SP8	3			bd	N.S.	
<i>P. pygmaeus</i>	30.05.2010	SP8	1			bd	N.S.	
<i>P. pygmaeus</i>	30.05.2010	SP8	1			bd	N.S.	
<i>B. barbastellus</i>	29.05.2010	SP13	1			bd	N.S.	
<i>P. nathusii</i>	29.05.2010	SP13	1			bd	N.S.	
<i>P. nathusii</i> / <i>P. kuhlii</i>	29.05.2010	SP13	1			bd	N.S.	
<i>P. pygmaeus</i>	29.05.2010	SP13	2			bd	N.S.	
<i>P. pygmaeus</i>	29.05.2010	SP13	3			bd	N.S.	
<i>P. pygmaeus</i>	29.05.2010	SP13	3			bd	N.S.	
<i>V. murinus</i>	29.05.2010	SP13	1			bd	N.S.	
<i>P. pygmaeus</i>	29.05.2010	SP25	5			bd	N.S.	
<i>P. pygmaeus</i>	29.05.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	29.05.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	29.05.2010	SP25	4			bd	N.S.	
<i>P. pygmaeus</i>	29.05.2010	SP25	5			bd	N.S.	
<i>P. nathusii</i> / <i>P. kuhlii</i>	11.07.2010	SP13	1			bd	N.S.	
<i>P. nathusii</i> / <i>P. kuhlii</i>	11.7.2010	SP13	1			bd	N.S.	
<i>P. nathusii</i> / <i>P. kuhlii</i>	11.7.2010	SP13	1			bd	N.S.	
<i>P. pygmaeus</i>	11.7.2010	SP13	1			bd	N.S.	
<i>P. nathusii</i> / <i>P. kuhlii</i>	11.7.2010	SP13	1			bd	N.S.	
<i>P. nathusii</i> / <i>P. kuhlii</i>	11.7.2010	SP13	1			bd	N.S.	
<i>P. pygmaeus</i>	11.7.2010	SP13	1			bd	N.S.	

<i>P. pygmaeus</i>	11.7.2010	SP13	1			bd	N.S.	
<i>Myotis sp.</i>	11.7.2010	SP13	1			bd	N.S.	45 kHz group
<i>Myotis sp.</i>	11.7.2010	SP25	1			bd	N.S.	45 kHz group
<i>V. murinus/ N. leisleri/ N. noctula</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>Myotis sp.</i>	11.7.2010	SP25	1			bd	N.S.	45 kHz group
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. nathusii/ P. kuhlii</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus/ M. schreibersii</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus/ M. schreibersii</i>	11.7.2010	SP25	1			bd	N.S.	
<i>E. serotinus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>Myotis sp.</i>	11.7.2010	SP25	1			bd	N.S.	45 kHz group
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>Myotis sp.</i>	11.7.2010	SP25	1			bd	N.S.	45 kHz group
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>Myotis sp.</i>	11.7.2010	SP25	1			bd	N.S.	45 kHz group
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>V. murinus/ N. leisleri/ N. noctula</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	social calls
<i>Myotis sp.</i>	11.7.2010	SP25	1			bd	N.S.	45 kHz group
<i>Myotis sp.</i>	11.7.2010	SP25	1			bd	N.S.	45 kHz group
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. nathusii/ P. kuhlii</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pipistrellus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>Myotis sp.</i>	11.7.2010	SP25	1			bd	N.S.	45 kHz group
<i>B. barbastellus</i>	11.7.2010	SP25	1			bd	N.S.	

<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pipistrellus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>B.barbastellus</i>	11.7.2010	SP25	1			bd	N.S.	
<i>P. pygmaeus</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. pygmaeus</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. pygmaeus</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. pygmaeus</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. pygmaeus</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. pygmaeus</i>	12.07.2010	SP8	1			bd	N.S.	
<i>E. serotinus</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. pygmaeus</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. pygmaeus</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. pygmaeus</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. pygmaeus</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. pygmaeus</i>	12.07.2010	SP8	1			bd	N.S.	social calls
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	social calls
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. pygmaeus</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. pipistrellus</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. pygmaeus</i>	12.07.2010	SP8				bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. pygmaeus</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. pygmaeus</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. pygmaeus</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii</i>	12.07.2010	SP8	1			bd	N.S.	
<i>P. nathusii/</i> <i>P. kuhlii</i>	12.07.2010	SP25	1			bd	N.S.	
<i>P. nathusii</i>	30.05.2010	above SP8	1	m	ad.	mn	N.S., A.H.	

<i>P. nathusii</i>	30.05.2010	above SP8	1	m	ad.	mn	N.S., A.H.	
<i>P. nathusii</i>	30.05.2010	above SP8	1	m	ad.	mn	N.S., A.H.	
<i>P. pygmaeus</i>	30.05.2010	above SP8	1	m	ad.	mn	N.S., A.H.	
<i>P. pygmaeus</i>	30.05.2010	above SP8	1	m	ad.	mn	N.S., A.H.	
<i>P. nathusii</i>	30.05.2010	above SP8	1	m	ad.	mn	N.S., A.H.	
<i>M. mystacinus</i>	29.05.2010	below SP25	1	f	ad.	mn	N.S., A.H.	pregnant
<i>B. barbastellus</i>	29.05.2010	between SP13-25	1	m	ad.	mn	N.S., A.H.	
<i>P. pipistrellus</i>	29.05.2010	below SP25	1	m	ad.	mn	N.S., A.H.	
<i>P. pipistrellus</i>	29.05.2010	below SP25	1	m	ad.	mn	N.S., A.H.	
<i>P. pygmaeus</i>	29.05.2010	below SP25	1	m	ad.	mn	N.S., A.H.	
<i>Pl. austriacus</i>	11.07.2010	below SP25	1	m	ad.	mn	N.S., A.H.	
<i>Pl. austriacus</i>	11.07.2010	below SP25	1	m	juv.	mn	N.S.	
<i>Pipistrellus sp.</i>	11.07.2010	below SP25	1			mn	N.S.	
<i>B. barbastellus</i>	09.10.2010	below SP25	1			mn	N.S.	
<i>Rh. hipposideros</i>	20.07.2010	Belasitsa hut	14			vo	B.N.	