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Bats (Mammalia: Chiroptera) of the Eastern Mediterranean. Part 5. Bat fauna of Cyprus: review of records with confirmation of six species new for the island and description of a new subspecies

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Abstract. A complete list of bat records available from Cyprus, based on both the literature data and new records gathered during recent field studies. The review of records is added with distribution maps and summaries of the distribution statuses of particular species. From the island of Cyprus, at least 195 confirmed records of 22 bat species are known; viz. *Rousettus aegyptiacus* (Geoffroy, 1810) (50 record localities), *Rhinolophus ferrumequinum* (Schreber, 1774) (12), *R. hipposideros* (Borkhausen, 1797) (18), *R. euryale* Blasius, 1853 (1–2), *R. mehelyi* Matschie, 1901 (1), *R. blasii* Peters, 1866 (11), *Myotis blythii* (Tomes, 1857) (4), *M. nattereri* (Kuhl, 1817) (11), *M. emarginatus* (Geoffroy, 1806) (2), *M. capaccinii* (Bonaparte, 1837) (1), *Eptesicus serotinus* (Schreber, 1774) (6), *E. anatolicus* Felten, 1971 (1), *Hypsugo savii* (Bonaparte, 1837) (10), *Pipistrellus pipistrellus* (Schreber, 1774) (2), *P. pygmaeus* (Leach, 1825) (3), *P. kuhlii* (Kuhl, 1817) (36), *Nyctalus noctula* (Schreber, 1774) (1–3), *N. leisleri* (Kuhl, 1817) (2), *N. lasiopterus* (Schreber, 1780) (1), *Plecotus kolombatovici* Đulić, 1980 (7), *Miniopterus schreibersii* (Kuhl, 1817) (7), and *Tadarida teniotis* (Rafinesque, 1814) (8). Four species (*Eptesicus anatolicus*, *Pipistrellus pipistrellus*, *Nyctalus leisleri*, *N. lasiopterus*) are reported here from Cyprus for the first time. Two other species (*Plecotus kolombatovici* and *Tadarida teniotis*), which were previously suggested to inhabit Cyprus, are here confirmed to occur the island. Cypriot populations of *Pipistrellus pygmaeus* have been found to be morphologically and genetically unique and therefore described as a separate subspecies, *P. pygmaeus cyprius* subsp. nov.

Distribution, taxonomy, Chiroptera, Middle East, *Pipistrellus*

INTRODUCTION

The island of Cyprus (9,251 km^2; Fig. 1), the third largest Mediterranean island, is situated in the northeastern corner of the Mediterranean Sea, ca. 70 km off the southern shore of Asia Minor and ca. 100 km west of the shore of the Levant. Biogeographically, it represents a part of the proper Mediterranean arboreal region, its vegetation belongs to the zone of Mediterranean woodland climaxes (Zohary 1973). The Cypriot fauna and flora are mostly composed of true Mediterranean elements with a large influence of the Irano-Turanian groups and with a certain level of island endemism (see the comparisons by Spitzenberger 1979).

Nevertheless, the geological history of Cyprus is unique and different from other Mediterranean islands. The island is a block of the oceanic crust of the Tethys Sea uplifted over subduction zone

of the Cypriot Arc. Deep sea above the subduction zone always kept the island isolated and its current distance from the nearest Anatolian shore (70 km) is the nearest since the Middle Miocene when the island first raised above the sea level (Schmidt 1960). The marked isolation of Cyprus from the Anatolian mainland was probably not interrupted by the sea-level drop during the Messinian Salinity Crisis (by 800–1300 m) – even then it was surrounded by sea ways (Ben-Avraham et al. 2006). However, during this time, the distance to the shore of Asia Minor via the Hatay and Latakia Basins was considerably shortened and a temporary terrestrial contact (5.9–5.4 Ma) cannot be completely excluded. In any case, the Late Cenozoic eustatic sea-level oscillations which essentially influenced biotic history of other Mediterranean islands did not change the extent of isolation of Cyprus. In short, Cyprus is the island which never came in contact with mainland at least during the last 5 Ma. Hence, it could be colonised only by overwater dispersals via rafting or aerial migrations and/or under direct influence of anthropogenic colonisations. The first archaeologically evidenced human colonisations are dated to the 10th millenium BC – which probably caused the extinction of the local dwarf hippopotamus, *Phanourios minor* (Desmarest, 1822) (Simmons 2001) – and since the Neolithic (7000 BC) the human settlements and contacts with mainland were more common (Swiny 2001). The original mammalian fauna prior to human colonisation was poor (Boekschoten & Sondaar 1972) and even the recent mammalian fauna of Cyprus exhibits the specifics corresponding to the above mentioned paleogeographic setting of the island.

Surprisingly, the contemporary mammalian fauna of Cyprus has not been well studied except for two major field studies – one undertaken by Dorothea Bate (Bate 1903) and the other

Fig. 1. General map of Cyprus; main geographical features mentioned in the text (pale shaded, area above 500 m a. s. l.; dark shaded, area above 1000 m a. s. l.).

Table 1. Composition of the bat fauna of Cyprus and cumulative numbers of the bat records of particular species according to subsequent reviews. Kryštufek & Vohralík (2001, 2005) mentioned only the presence of a species but not review of its records. The unconfirmed records or species affiliations are in parantheses

species	Bate 1903	Spitzenberger 1979	Boye et al. 1990	Kryštufek & Vohralík 2001, 2005	present review
Rousettus aegyptiacus	+	9	21	+	50
Rhinolophus ferrumequinum	2	2	4	+	12
Rhinolophus hipposideros	1	5	8	+	18–20
Rhinolophus euryale	–	(–)	1	+	(1–2)
Rhinolophus mehelyi	–	1	1	+	1
Rhinolophus blasii	1	4	6	+	11
Myotis blythii	(1)	1	2	+	4
Myotis nattereri	–	–	3	+	11
Myotis emarginatus	–	–	–	+	2
Myotis capaccinii	–	(1)	1	+	(1)
Eptesicus serotinus	–	1	1	+	6
Eptesicus anatolicus	–	–	–	–	1
Hypsugo savii	–	1	1	+	10
Pipistrellus pipistrellus	–	–	–	–	2
Pipistrellus pygmaeus	–	–	–	+	3
Pipistrellus kuhlii	2	4	14	+	36
Nyctalus noctula	–	1	1–2	+	(1–3)
Nyctalus leisleri	–	–	–	–	2
Nyctalus lasiopterus	–	–	–	–	1
Plecotus kolombatovici	–	–	(2)	(+)	7
Miniopterus schreibersii	1	1	3	+	7
Tadarida teniotis	–	–	(1)	+	8
total species	6–7	11+	15–16	17–18	22

by Friederike Spitzenberger (Spitzenberger 1978, 1979) – constituting the basic knowledge of Cypriot mammals, including bats (Table 1). Bate (1903) reviewed the presence of at least six bat species (among 15 mammal species), however, almost without giving detailed distribution data. Spitzenberger (1978, 1979) summarised extensive results of her own field studies and reported well documented occurrence of 20 mammalian species from Cyprus, including at least 11 species of bats. She showed bats to be the prevailing component of the Cypriot mammalian fauna and provided numerous data on ecology of particular species as well as detailed taxonomic analyses in three bat species (*Rousettus aegyptiacus*, *Rhinolophus hipposideros* and *Myotis blythii*). The latest paper surveying the Cypriot bat fauna in details is that by Boye et al. (1990) who reported new records of 11–12 species by which the total number of Cypriot bat species increased to 15–16.

The first reported bat species from Cyprus was the most remarkable member of its bat fauna, *Rousettus aegyptiacus* (Geoffroy, 1810). It was mentioned by Unger & Kotschy (1865), who also reported a bat named *Vespertilio murinus*, which could be co-identified with the modern *Myotis blythii* (Tomes, 1857) (see below). Günther (1879) mentioned the first undoubtedly identifiable record of a vespertilionid bat, *Pipistrellus kuhlii* (Kuhl 1817), and Doria (1887) of a rhinolophid, *Rhinolophus hipposideros* (Borkhausen, 1797). Bate (1903) in her review of Cypriot mammals added three species of bats, *Rhinolophus ferrumequinum* (Schreber, 1774), *R. blasii* Peters, 1866 and *Miniopterus schreibersii* (Kuhl, 1817) and the report of '*V. murinus*' by Unger & Kotschy (1865) interpreted as *Myotis myotis* (Borkhausen, 1797). Kahmann & Çağlar (1959, 1960) further mentioned the occurrence of *Rhinolophus mehelyi* Matschie, 1901 and *Myotis capaccinii* (Bonaparte, 1837) in Cyprus, however, without giving any details. Another bat species, *Hypsugo*

savii (Bonaparte, 1837), was mentioned by Harrison (1961) based on an older museum specimen from the British Museum (Natural History). As a result of several research trips to Cyprus, Spitzenberger (1979) added three bat species to the island's fauna, *Myotis blythii* (Tomes, 1857), *Eptesicus serotinus* (Schreber, 1774) and *Nyctalus noctula* (Schreber, 1774). However, *M. blythii* was perhaps found already by Unger & Kotschy (1865) (but mentioned under an incorrect name, see above). Boye et al. (1990) reported *Rhinolophus euryale* Blasius, 1853, *Myotis nattereri* (Kuhl, 1817) and *Plecotus austriacus* (Fischer, 1829) from Cyprus; they also suggested a possible occurrence of another species, *Tadarida teniotis* (Rafinesque, 1814). More recently, two other species were added to the Cypriot fauna, *Myotis emarginatus* (Geoffroy, 1806) (Heller et al. 2001), and *Pipistrellus pygmaeus* (Leach, 1825) (Hanák et al. 2001, Stadelmann et al. 2004, Hulva et al. 2004). Finally, Kryštufek & Vohralík (2001, 2005) listed 18 species of bats in their comprehensive survey of mammals of Turkey and Cyprus, including the doubtful items (Table 1).

Despite these efforts, the Cypriot bat fauna has belonged to the least known one in the eastern Mediterranean until recently. Seven species were recorded just with a single poorly documented record (or even single individual), and reliable information on taxonomic status was available only in a few species. There was no information at all on the relationship between the island and mainland populations, and, consequently, on the history of Cypriot bat fauna and biogeographic specifics of that region.

With respect to this, we performed several research trips to Cyprus, visited about 40 localities and collected numerous records of 18 species of bats. This effort has increased the number of species reported in the island to 22. We collected many tissue samples for molecular analyses (in total 336 individuals of 18 species) that will be reported elsewhere. A limited number of voucher specimens is deposited in the collections of the National Museum (Natural History), Prague and Natural History Museum, Geneva. Here, we present a review of all available bat records from Cyprus as well as some additional data on bat biology from this island. With this paper we continue the summaries on bat fauna of the northern regions of the eastern Mediterranean already published (Benda & Horáček 1998, Hanák et al. 2001, Benda et al. 2003b, 2006) and emphasise the quite specific insular conditions of the Cypriot fauna.

MATERIAL AND METHODS

The lists of records (arranged in alphabetical and/or chronological order) include the following information: political part of the island (in spaced types), name of the locality (each record is primarily listed by a name of the nearest settlement) [in brackets, number of locality as indicated in the map], and/or description of the record site, date, number of recorded bats with indication of their sex, age and physiological condition (see Abbreviations below for details).

For morphological comparisons, we used museum specimens, which were examined in the same way as described in previous studies (e.g., Benda et al. 2004a, b). The specimens were measured in a standard way with the use of mechanical or optical callipers. For the evaluated external and cranial measurements, see Abbreviations. Statistical analyses were performed using the software Statistica 6.0. Other methodological details or aspects are discussed in the chapters concerning taxonomic revisions of the respective species.

For the genetic part of the study applied on several species, we have used the analysis of mitochondrial DNA. Genetic material was obtained from pectoral muscles or wing punches preserved in alcohol. 402 bp of cytochrome *b* gene (or 1140 bp in the case of *Rousettus aegyptiacus* comparison) were isolated according to the protocol described by Hulva et al. (2004). For comparisons, sequences from previous studies stored at GenBank were used, as described in the respective species chapters. Genetic distances and phylogenetic reconstructions were obtained using PAUP 4.0b10 (Swofford 2001).

ABBREVIATIONS

Collections

BMNH – Natural History Museum, London, United Kingdom; FMNH – Field Museum of Natural History, Chicago, U. S. A.; MHNG – Natural History Museum, Geneva, Switzerland; MNS – State Natural History Museum, Stuttgart,

Germany; MSNF – Natural History Museum, Florence, Italy; NMP – National Museum (Natural History), Prague, Czech Republic; NMW – Natural History Museum, Vienna, Austria; SKM – University of Munich, Germany; USNM – United States National Museum, Washington, U. S. A.; ZMA – Zoological Museum, Amsterdam, the Netherlands; ZIN – Zoological Institute, St. Petersbourg, Russia; ZMB – Zoological Museum, Humboldt University, Berlin, Germany.

Measurements
LC = head and body length; LCd = tail length; LAt = forearm length; LPol = thumb length (without claw); LA = auricle length; LTr = tragus length; G = body weight; LCr = greatest length of skull; LCb = condylobasal length of skull; LCc = condylocanine length of skull; LaZ = zygomatic width; LaI = width of interorbital constriction; LaN = neurocranium width; ANc = neurocranium height; LBT = largest horisontal length of tympanic bulla; CC = rostral width between canines (incl.); M^3M^3 = rostral width between third upper molars (incl.); CM^3 = length of upper tooth-row between CM^3 (incl.); M^1M^3 = length of upper tooth-row between M^1M^3 (incl.); CP^4 = length of upper tooth-row between CP^4 (incl.); LCs = mesiodistal length of the upper canine; LaCs = palatolabial width of the upper canine; LMd = condylar length of mandible; ACo = height of coronoid process; CM_3 = length of lower tooth-row between CM_3 (incl.); M_1M_3 = length of upper tooth-row between M_1M_3 (incl.); CP_4 = length of upper tooth-row between CP_4 (incl.).

Other abbreviations
a = adult; A = alcoholic preparation; B = skin (balg); f = female; j = juvenile; m = male; s = subadult; S = skull; Sk = skeleton.

LIST OF SPECIES

Rousettus aegyptiacus (Geoffroy, 1810)

Records. **Original data**: S o u t h e r n C y p r u s: Kynousa, pine forest 1 km to E [1], 6 September 2000: net. 1 fa, 2 faL; – Neo Horio, ca. 4 km to NNW, Loutra tis Afroditis ('Baths of Aphrodite') [2], 9 April 2005: a carcass of an adult individual found in the water pool (NMP 90399 [S]); – Neo Horio, Petratis gorge ca. 4 km to E [3], small caves, 7 September 2000: obs. a nursery colony of ca. 100 inds. and several isolated inds.; – Neo Horio, Smigies Trail ca. 3 km to NW, abandoned chromite mine system 'Magnesia Mine' [4], 27 March 2005: obs. colony of ca. 20 inds. inside the mine, net. 2 fs at entrance and 1 ms above a cliff (NMP 91274 [S+A]); 12 October 2005: net. 5 mj, 2 fj; a rocky niche in a top of hill, 27 March 2005: net. 1 fs; – Paramali, 2 km to SW [5], disused stream ford, 10 April 2005: obs. 1 flying ind.; – Prodromi, Androlikou gorge ca. 2 km to SW [6], small cave, 26 March 2005: net. 10 ma, 2 fa, 4 fs; 20 April 2005: net. 1 ma (NMP 90435 [S+A]), obs. several feeding inds.; – Steni, small cave 1.5 km to E [7], 6 September 2000: obs. nursery colony of ca. 50 inds., coll. 1 fj (MHNG 1807.092 [A]). – N o r t h e r n C y p r u s: Afendrika, ruins of the Asomatos church [8], 17 October 2005: net. 13 ma, 4 fs/j; – Agırdağ, cleft cave [9], 5–6 April 2005: obs. colony of min. 12 inds., net. 6 ma, 1 fa, 1 fs; – Beylerbeyi, Bellapais Abbey ruins [10], 27 July 2006: feeding rests (places with remnants of repeated feeding; Fig. 2); – Gazimağusa, old town [11], ruins of two mediaeval churches, 19 April 2005 & 25 July 2006: feeding rests (places with remnants of repeated feeding; Fig. 3); – Lefkoşa, above a highway at the eastern margin of the town [12], 6 April 2005: obs. 1 flying ind.; – St. Hilarion Castle, cave in a cliff wall below the castle [13], 4 April 2005: obs. colony of ca. 50 inds.; – Yedikonuk, a cave ca. 2 km to N [14; Fig. 4], 17 October 2005: obs. colony of ca. 800 inds. (exam. 3 ma, 3 fa, 8 fa+6mj, 2fj). – **Published data**: S o u t h e r n C y p r u s: Akamas [cf. 2, 4], 1987, destroyed roost (Boye et al. 1990); Akamas, cave, 1990–1993: ca. 1000 inds. (Hadjisterkotis 2006); – Akamas, Petratis [3], cave, 1960s: several thousands inds., 1990–1993: ca. 1000 inds. (Hadjisterkotis 2006); – Akamas, Thalassines spilies [15], cave, 1960s: several hundreds inds., 1990–1993: 1 ind. (Hadjisterkotis 2006); – Akrotiri [16] (Bergmans 1994); – Apsiou [17] (Limassol), 30 March 1973: 30 m, 83 f (NMW 20730–20843 [107 S, 7 Sk, 7 B, 6 A]), a colony of 400–500 inds. (Spitzenberger 1979); Apsiou, 30 March 1973: 1 ms, 1 f (ZMA 22.124, 22.125 [S+A]; leg. F. Spitzenberger) (Bergmans 1994); 1988, destroyed roost (Boye et al. 1990); – Asproyia [= Asprogia], cave [18], 1960s: several hundreds of inds. (Hadjisterkotis 2006); – Ayia [= Agia] Napa [19] (Famagusta), 6 April 1973: 7 m, 4 f (NMW 20981–20991 [11 S]) (Spitzenberger 1979); – Cape Greco [= Akrotiro Gkreko] [20], 1988, destroyed roost (Boye et al. 1990); – Empa, cave [21], 1960s: several hundreds of inds. (Hadjisterkotis 2006); – near Episkopi [22], specimens recorded (Boye et al. 1990); – Episkopi Bay [23] (Bergmans 1994); – Kissonerga, cave [24], 1960s: several hundreds of inds. (Hadjisterkotis 2006); – Konktia [= ?Kouklia] [25], 21 April 1913: 4 inds. (ZMB; G. Cecconi) (Bergmans 1994); – Ktema [= Ktima] [26], 200', 18 March 1902: 1 fj (BMNH 3.12.4.4 [S+B]; leg. Miss D. M. A. Bate) (Andersen 1912); – Larnaka [27], 1896: 1 f (MNS 2210 [S+A]) (Kock 1978); Larnaka, 1 ind. (USNM 123303; leg. G. Cecconi) (Bergmans 1994); – Lachi [= Latsi] [28] (Bergmans 1994); – some km to S of Lachi [= Latsi] [cf. 3], 15 and 16 May 1985: 6 m, 1 f, 2 fs (ZMA 22902–22910; leg. J. van Wingerde) (Bergmans 1994); – Limassol [= Lemesos] [29], a cave to N, early 1980s: obs. colony of 300–400 inds., late 1980s: obs. 1 ind. (Boye et al. 1990); – Nicosia [= Lefkosia] [30], 440–700', April, October and November 1901–1902: 1 ma, 2 mj, 1 fa, 1 fj (BMNH 3.12.4.1–3.12.4.3, 3.12.4.5, 3.12.4.6 [5 B, 2 S]; leg. Miss D. M. A. Bate) (Andersen 1912, cf. Bergmans 1994); Nikosia, 1 ind. (cf. Reinhold 1987); – near Paphos [= Pafos] [31], specimens recorded (Boye et al. 1990); – Paralimni

Figs. 2, 3. Feeding places of *Rousettus aegyptiacus* (Geoffroy, 1810) found in populated sites of Cyprus (both photos by Z. Bendová); remnants included mainly date and apricot stones (along with faeces and urine splodges). 2 (left) – ruined Bellapais Abbey at Beylerbeyi. 3 (right) – ruined church of St. George of the Greeks in Gazimağusa.

[32] (Bergmans 1994); – Paramali [33], 1988, destroyed roost (Boye et al. 1990); – Polemi, cave [34], 1960s: several hundreds of inds. (Hadjisterkotis 2006); – Polis [35] (Bergmans 1994); – Prastiou [= Prastio] [36] (Limassol), 31 March 1973: 1 ind. (NMW 20867 [A]) (Spitzenberger 1979); – Prastiou [= Prastio], mine [37] (Limassol), 31 March 1973: 6 m, 17 f (NMW 20844–20866 [23 S]), colony of ca. 800 inds. (Spitzenberger 1979); – between Pyla and Troulli [= Troulloi] [38] (Larnaca), January–July 1977: 1 f (NMW 23386 [S]; leg. K. Kollnberger) (Spitzenberger 1979); – Steni, cave [7], 1960s: several hundreds of inds. (Hadjisterkotis 2006); – Stroumbi [= Stroumpi], cave [39], 1960s: several hundreds of inds., 1990–1993: ca. 50 inds. (Hadjisterkotis 2006); – Vretsia, cave [40], 1960s: several hundreds of inds., 1990–1993: obs. inds. (Hadjisterkotis 2006); – Yermasoyia-Reservoir [= Germasogeia] [41], (Limassol), 3 April 1973: 40 m, 69 f, 4 inds. (NMW 20868–20980 [113 S]), 145 inds. (from owl pellets) (Spitzenberger 1979); Yermasoia [= Germasogeia] Reservoir, 1987 and 1988, destroyed roost (Boye et al. 1990). – N o r t h e r n C y p r u s: near Ayioa [= Agios] Epiktitos [42] (Bergmans 1994); – Bellapais Abbey [10], feeding rests (Spitzenberger 1979); Bellapais, monastery ruins, 8 August 1988: 15 inds. (Opstaele 1990); Bellapais, 1989, destroyed roost (Boye et al. 1990); – Famagusta (= Gazimağusa) [11], obs. 20–50 inds. (Spitzenberger 1979); at Famagusta, specimens recorded (Boye et al. 1990); – west of Nicosia [= Lefkoşa] [43], specimens recorded (Boye et al. 1990); – between Klepini and Pentadactylos [= Pentadaktylos, Beşparmak] [44] (Bergmans 1994); – near Kyrenia [45], specimens recorded (Boye et al. 1990). – C y p r u s: Insel Zypern [= Cyprus] (Unger & Kotschy 1865) = Zypern [= Cyprus], without exact finding site, 1863: 2 f (NMW 17874, 17875 [A]; leg. Th. Kotschy) (Spitzenberger 1979); – Cyprus, 38 inds. [Lord Lilford coll.] (Günther 1879; as *Cynonycteris collaris*) = Cyprus, 4 ma, 4 fa (BMNH 79.10.16.1–79.10.16.6, 99.7.2.1, 99.7.2.2 [6 A, 4 S]; Lord Lilford coll.) (Andersen 1912, Bergmans 1994); – Cypern [= Cyprus], 3 m, 1 f [Rolle] (Matschie 1899) = Cyprus, 1 ms, 1 f, 2 inds. (ZMB 10248–10251 [S+A]; leg. Rolle) (Bergmans 1994); – excessively common in Cyprus (Bate 1903); – Cyprus (Theodor 1954); – [Cyprus undef.] Trozina (Bergmans 1994).

Comments. *Rousettus aegyptiacus* is the most frequently recorded bat species in Cyprus, at least 46 localities are available from throughout the island (see Fig. 5 and Table 1), plus some other

Fig. 4. Caves ca. 2 km north of Yedikonuk, Karpaz peninsula, northeastern Cyprus, where a colony of ca. 800 individuals of *Rousettus aegyptiacus* was found (photo by I. Horáček).

unlocalised reports (and most probably, there exist also some overlooked reports similar to those by Rheinhold 1984 or Opstaele 1990). The records come mainly from the agricultural landscape at lower altitudes, from the sea level to foothills of higher mountain ranges. Although the highest site of *R. aegyptiacus* is reported from around 770 m a. s. l. (Asprogia; Hadjisterkotis 2006), the

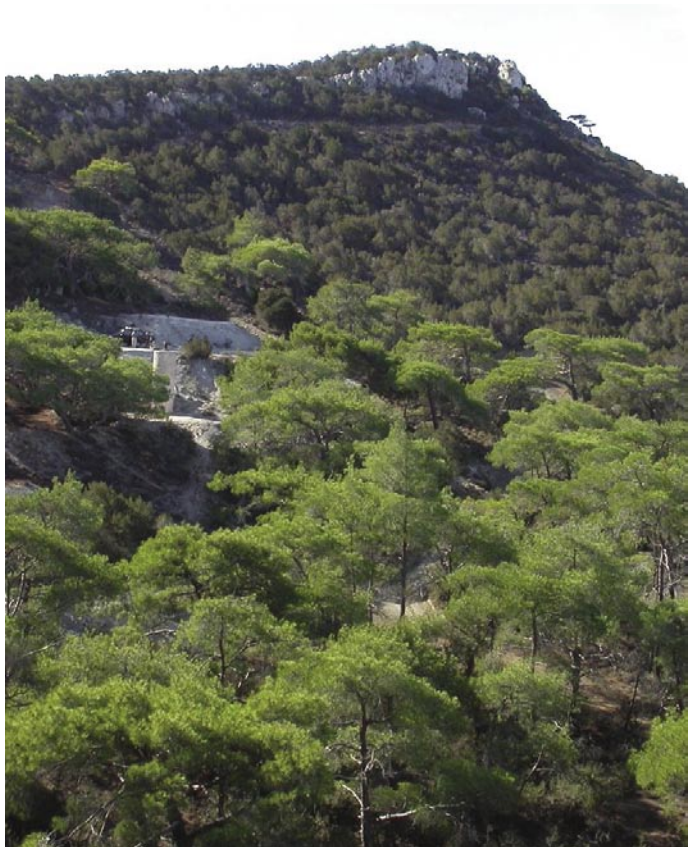
Fig. 5. Records of *Rousettus aegyptiacus* (Geoffroy, 1810) in Cyprus.

mean altitude is only 187 m and about two third of the Cypriot localities (34) are found at the altitudes below this level. Along with *Pipistrellus kuhlii*, the second most frequently recorded bat species in Cyprus (Table 1), *R. aegyptiacus* represents a rather lowland element within the Cypriot bat fauna.

The amount of *R. aegyptiacus* records contrasts with record numbers of other bat species, probably because this large colonial bat is relatively more conspicuous than other bats and because it represents an easily distinguishable serious agricultural pest (see the detailed history of anti-bat campaigns by Hadjisterkotis 2006*). Reports of *R. aegyptiacus* include the oldest known records of bats coming from the island (Unger & Kotschy 1865, Günther 1879, Tristram 1884, Matschie 1899, etc.). The density of records of *R. aegyptiacus* in Cyprus is also remarkable compared to the records known in the nearby mainland of the northern Levant (i.e., at latitudes corresponding to or higher than those of Cyprus, see the reviews by Bergmans 1994, Karataş et al. 2003b and Benda et al. 2006). In this respect, it resembles the situation known from Lebanon and Israel (i.e., at latitudes lower than those of Cyprus, see Tohmé & Tohmé 1985 and Mendelssohn & Yom-Tov 1999). Since its occurrence in southern Turkey and western Syria comprises the northernmost margins of the species distribution range (Bergmans 1994) and seems to represent rather scarce and even isolated fringes of the range, the Cypriot population of *R. aegyptiacus* represents the northernmost well established and prospering population of the species; the total number of record sites in Turkey and Syria comprises only about one third of those in Cyprus. Spitzenberger (1979) described life history adaptations of the species to the Mediterranean climate on the example of Cypriot samples, which are possibly rather unique for the island populations (see also below). Despite its Neogene records in the western part of the Mediterranean (Aguilar et al. 1985), its present distribution is restricted to the easternmost parts (SW Turkey, Cyprus, W Syria, Lebanon, Israel, W Jordan, and Egypt but not Cyrenaica or Crete) and to the zone of thermo-Mediterranean (in the sense by Blondel & Aronson 2005). *R. aegyptiacus* differs considerably in its distribution pattern from other species; in a database of 5,869 bat records placed in the 2×2 degree grid system covering the eastern Mediterranean (26° to 42° N, 18° to 60° E), this species exhibits an extreme disproportion between relatively high abundance in all occupied grid cells or even quite a high mean frequency in the sample (1.09) and a very low number of actually occupied cells (i.e. constancy reaching 0.16 only). Surprisingly, it is absent from all islands except for Cyprus (cf. Horáček et al. 2007b).

Unlike for other bat species in Cyprus in which the capture data prevail, the evidence of *R. aegyptiacus* comes mostly from visual observations of colonies and/or individuals inhabiting caves or mines (Figs. 4, 6, 7). In our original data, six such observations are present (40% of all records, 46% of direct findings) while only four records are nettings (27% and 31%, respectively). The remaining five records comprise observations of flying bats or findings of traditional feeding places with remnants of eaten fruits (Figs. 2, 3). In the published data, the findings from underground shelters make up 67% of records (however, most of the published data represent undefined records). Spitzenberger (1979) reported a well marked bimodal pattern in the reproduction of Cypriot population of *R. aegyptiacus*, with one peak of births in April and another in June and

* Note. Hadjisterkotis (2006) reviewed the history of official campaigns for the destruction of *R. aegyptiacus* populations in Cyprus, organised by authorities of the British colonial government and government of the Republic of Cyprus. The campaigns took place in the period from 1927 to 1983 (with several breaks and with different intensity) and rewards for killed bats were paid in the early years of the campaigns. In the years 1933–1938, rewards for some 10,000 killed bats were paid, and in 1955–1956 for almost 1,600 bats (Hadjisterkotis 2006). Although the official support for killing of *R. aegyptiacus* has not been recently prolonged according to the data by Hadjisterkotis (2006), we cannot exclude a continuation of the destructions by an initiative of local farmers as suggested by records of fumigated caves (see also Boye et al. 1990). Anyway, in the present time, *R. aegyptiacus* is officially protected in Cyprus by national and European laws and its numbers are supposed to be recovering (Hadjisterkotis 2006).



Figs. 6, 7. Two record sites of *Rousettus aegyptiacus* (Geoffroy, 1810) in the Akamas peninsula, western Cyprus (both photos by I. Horáček). 6 (left) – small caves and rocky overhangs in the upper part of the Androlikou gorge ca. 2 km southwest of Prodromi, eastern Akamas (calls of *Rhinolophus ferrumequinum*, *Hypsugo savii*, *Pipistrellus kuhlii*, and *Tadarida teniotis* were also recorded there). 7 (right) – abandoned chromite mine system 'Magnesia Mine' with galleries in three levels, on the Smigies Trail ca. 3 km northwest of Neo Horio, central Akamas; the fruit bats were found inside the mine in March, netted at the entrance to one of the galleries and above a cliff near the top of the hill in March and October but were not be recorded in April and July (*Rhinolophus ferrumequinum*, *R. hipposideros*, *Myotis nattereri*, *Hypsugo savii*, *Pipistrellus kuhlii*, *Plecotus kolombatovici*, *Miniopterus schreibersii*, and *Tadarida teniotis* were also recorded in and at the system, i.e. the absolutely highest number of bat species associated with one site in Cyprus).

Table 2. Genetic P-distaces among *Rousettus aegyptiacus* haplotypes from the Mediterranean and the Middle East based on complete cytochrome *b* sequences (1140 bp). For the comparative samples origin see Benda et al. (2006)

haplotype	[1]	[2]	[3]	[4]	[5]	[6]	[7]
[1] Cyprus (*biopsy*, Androlikou)	–						
[2] Lebanon (*biopsy*, Nahr es Safe)	0.011	–					
[3] Syria (NMP 48264)	0.011	0.001	–				
[4] NE Egypt (NMP 90504)	0.012	0.002	0.003	–			
[5] SW Egypt (NMP 91817)	0.026	0.015	0.016	0.017	–		
[6] Yemen (NMP pb2960)	0.011	0.002	0.003	0.004	0.017	–	
[7] SE Iran (NMP 48383)	0.011	0.001	0.002	0.001	0.016	0.003	–

July. Besides that, she also found frequent appearance of twin embryos of different size, which might suggest a superfoetation, i.e. a further mechanism contributing to plasticity of breeding biology in the species. Our observations conform to bimodality of the birth periods and timing, as suggested by Spitzenberger (1979).

External and cranial dimensions of the examined Cypriot specimens of *R. aegyptiacus* are shown in Appendix III. They correspond quite well with those reported (based on n>500) by Spitzenberger (1979) and conform also her conclusions that the morphometric characteristics of the Cypriot population of the species do not differ in any respect from those of the Levantine and Egyptian populations (see also Bergmans 1994 and Benda et al. 2006 for a review).

This conclusion is supported also by preliminary results of genetic comparisons based on sequence data on the mitochondrial gene for cytochrome *b*. The Cypriot haplotype is a member of a shallow clade comprising the eastern Mediterranean and other Middle Eastern samples (Syria, Lebanon, Egypt, Iran, Yemen; Table 2). This genetic homogeneity (genetic distance of 1.1–2.6%) suggests either an extensive gene flow among populations (a quite unlikely possibility given the isolation of Cyprus) or that the local, Cypriot populations originate from a single, quite recent dispersal event from the mainland.

In contrast to other taxa like *Pipistrellus pipistrellus* complex (Hulva et al. 2004), *Myotis myotis* group (Ruedi et al. 2004) or *Miniopterus schreibersii* (Bilgin et al. 2006), *R. aegyptiacus* therefore shows almost no clear geographic genetic partitioning not only within the eastern Mediterranean but also in neighbouring areas (Yemen, Iran, SW Egypt). All the populations are separated with shallow distances, suggesting that they share a recent common ancestor or maintain gene flow among all these regions. As an additional explanation, we propose the following facts: (1) *R. aegyptiacus* is apparently a good disperser – few tens of kilometres represent apparently no barrier for its spreading. Then it is surprising why the species distribution of in the region is not more continuous (note a very low constancy in the species). Consequently, (2) there are obviously certain limiting ecological factors, which restrict further spreading of the species. The first of them is a continuous availability of appropriate food (fruits) throughout the vegetation season. For that reason the desert regions are not colonised though the species may survive temporarily even in quite isolated oases (cf. E Iran, Yemen, Sinai – own unpubl. data). (3) A physiological inability to hibernate limits colonisation to the more northerly regions or to those at higher altitudes because of unsuitable conditions during the winter. Nevertheless, even in the thermo-Mediterranean, winters are relatively cold and do not offer the preferred diet of *R. aegyptiacus* (soft fruits such as bananas, oranges, figs, etc.). (4) The winter shortage of diet is thus probably an important limiting factor for the survival of this species. In the Mediterranean, *R. aegyptiacus* feeds almost exclusively on the carob (*Ceratonia siliqua* Linnaeus, 1758). This was reported many times both from Cyprus (already by Unger & Kotschy 1865) and Israel. Korine et al. (1999) demonstrated that in Israel,

Ceratonia (together with the Chinaberry, *Melia azedarach* Linnaeus, 1753, an Indian tree introduced to the Mediterranean but rare in Cyprus) forms a predominant component of the diet from November to March while it is absent in the diet in other months. In Cyprus we observed feeding on carob until the beginning of April – the feeding is associated with transportation of the fruits into feeding caves (small spacious caves not used for roosting) where the floor is often covered by seeds and pod remnants of carob (Fig. 8). Later, from mid-April when other fruits appear, *R. aegyptiacus* stop feeding on carob including night visits of the feeding caves, changing the way of foraging. From that time on, the captured individuals avoided (in contrast to other fruits) carob quite strictly. (5) The relationship between *R. aegyptiacus* and carob is even tighter, of course. The origin and background of the quaint features of the tree are often considered as quite unclear. Here we suggest that most of them, particularly the fructification strategy of the tree (cf. cauliflory, long fructification period timed to winter, olfactoric instead of optic signs of fructification, etc.), evolved apparently under a strong dependence on chiropterochory. At the same time, *R. aegyptiacus* could quite successfully play a role of a very effective agent of seed dispersal.

The original range of the carob is generally unknown, it is expected that is was relatively small and supposedly restricted to the Levant (De Candolle 1883, Batlle & Tous 1997, Bures et al. 2004). Since we suggest here that in the Mediterranean, *R. aegyptiacus* and *C. siliqua* represent a single, densely integrated synchorologic unit (established under conditions of pronounced seasonality, particularly pertinent in the latest Caenozoic), we expect the same for *R. aegyptiacus* too. Despite of its dispersal potential, this bat was capable to survive only in the region first colonised by the carob. In contrast, the long distance seed dispersal is almost impossible for the carob and there is no motivation for the bat to perform it. The situation changed with human impact and the anthropogenic spreading of the carob throughout the ancient World that may have provided the conditions for successful colonisation of many regions of the eastern Mediterranean thermal

Fig. 8. Remnants of the carob (*Ceratonia siliqua*) consumed by *Rousettus aegyptiacus* in Cyprus in winter (gallery of the abandoned 'Magnesia Mine' near Neo Horio, central Akamas, see Fig. 7) (photo by I. Horáček).

zone by *R. aegyptiacus*. This scenario would then explain the lack of major genetic differentiation among populations. The species has not succeed in colonising other suitable but more distant (or more isolated) regions from its original range in the Levant (e.g. Crete, Aegean Islands, and/or central and western Mediterranean) though rich in carob (see also Horáček et al. 2007a).

Rhinolophus ferrumequinum (Schreber, 1774)

Records. **Original data**: S o u t h e r n C y p r u s: Apsiou [1], irrigation reservoir near the village, 30 March 2005: det. 1 ind.; – Kakopetria, Troodos Forest, abandoned mine 5 km to SW [2], upper gallery (Fig. 10), 13 October 2005: net. 1 ma, 1 mj, 1 fs, det. 1 ind. near the mine entrance; 14 October 2005: net. 1 ma (NMP 91225 [S+A]); – Kalavasos, abandoned mine ca. 3 km to NW [3; Fig. 11], 19 April 2005: net. 1 faG (NMP 90432 [S+A]); – Neo Horio, Smigies Trail ca. 3 km to NW [4], abandoned chromite mine system 'Magnesia Mine', 27 March 2005: coll. 1 ma, 1 fs, net. 1 fa (NMP 91248 [A], 91249, 91250 [S+A]); 12 October 2005: obs. 3 inds. in mine, net. 3 fa (NMP 91204 [A], 91205, 91206 [S+A]); 21 July 2006: obs. 2 inds. in the mine; – Prodromi, Androlikou gorge ca. 2 km to SW [5], 26 March 2005: det. 1 ind.; – Troodos, Troodos Forest ca. 3 km to W [6], Hadjipavlou Mine (Fig. 16), 14 October 2005: net. 1 ma, obs. & det. 3–4 inds. – N o r t h e r n C y p r u s: Afendrika [7], ruins near the Panagia Chrysiotissa church, 17 October 2005: net. 1 ma (NMP 91235 [S+A]); – Çınarlı, Inçirli cave ca. 4 km to SE [8], 6 April 2005: det. 1 ind., 17 April 2005: net. 1 ma (NMP 90425 [S+A]); 15 October 2005: net. 1 ma (NMP 91234 [S+A]); – Sourp Magar Ermeni Manastiri [9], monastery ruins, 26 July 2006: obs. 1 ind. – **Published data**: S o u t h e r n C y p r u s: Akamas peninsula [cf. 4], cave, March 1989: obs. 1 ind. (Boye et al. 1990), May 1990: caught 1 m (Boye et al. 1990); – Pano Panayia [= Panagia] [10], a cave near, 1988: 1 ind. (skeleton) (Boye et al. 1990), 10 December 1989: obs. 1 ind. (Boye et al. 1990), May 1990: obs. 1 ind. (Boye et al. 1990). – C y p r u s: Cyprus, 1 ind. [Lord Lilford coll.] + 1 ind. (Bate 1903) = Cyprus, 2 inds. (Andersen 1905).

Comments. *Rhinolophus ferrumequinum* ranks among the most common bat species in Cyprus, at least 10 record sites are known throughout the island (Fig. 9). The altitude range of records

Fig. 9. Records of *Rhinolophus ferrumequinum* (Schreber, 1774) in Cyprus.

Fig. 10. Entrance to the upper gallery of an abandoned mine in the Troodos Forest, ca. 5 km southwest of Kakopetria, at ca. 1665 m a. s. l. Record site of one of the richest bat communities in Cyprus; *Rhinolophus ferrumequinum*, *R. hipposideros*, *R. blasii*, *Myotis nattereri*, *M. emarginatus*, *Hypsugo savii*, and *Plecotus kolombatovici* were netted at the entrance and the call of *Pipistrellus pipistrellus* s.str. was recorded in the near surroundings (photo by Z. Bendová).

covers all parts of Cyprus (25–1665 m a. s. l.; mean 606 m); *R. ferrumequinum* seems to occur in all island's habitats including dry coastal areas and forested mountains, similarly as in other parts of its Mediterranean range (see e.g., Hanák et al. 2001, Benda et al. 2003b, 2006).

Most of the records are related to underground roosts, where the bats were collected or observed (8 records) or were netted or detected at roost entrances (9). Exceptions include a male netted at the ruined church of Panagia Chrysiotissa, the observation of a bat in the ruined Armenian monastery of Sourp Magar (both in northern Cyprus), and a detector record above a reservoir at Apsiou. Despite the high number of records from underground, only two of them relate possibly to nursery colonies (from mines at Kakopetria [2] and at Kalavasos [3]; Figs. 10, 11).

External and cranial dimensions of the examined Cypriot specimens of *R. ferrumequinum* are shown in Appendix III. According to skull size, the Cypriot populations of *R. ferrumequinum* belong to the large Mediterranean form, assigned to the nominotypical subspecies (see the review and analysis by Benda et al. 2006). This conclusion only partly conforms to preliminary results of molecular genetic analysis (Kůs et al. in prep.). Most of the Cypriot samples (originating in western, central and southern parts of the island) show close relations to the bats from Crete and

Fig. 11. Entrance to an abandoned mine ca. 3 km northwest of Kalavasos; record site of *Rhinolophus ferrumequinum*, *R. blasii*, *Pipistrellus kuhlii*, and *Miniopterus schreibersii* (this review) and most probably a record site of nursery colonies of *Rhinolophus hipposideros* and *Myotis emarginatus* mentioned by Heller et al. (2001) (photo by Z. Bendová).

continental Europe (Balkans, Central Europe), while others (from two sites in the north-eastern corner of Cyprus) to the Middle Eastern populations (E Turkey, Levant and Iran). Since the European and Middle Eastern clades were genetically slightly divergent (minimum about 1%), these results suggest at least two colonisation events to the island from mainland bats, possibly of different geographic origins. At the same time, the taxonomic division of the eastern Mediterranean populations of *R. ferrumequinum* based on skull size and pelage coloration (see DeBlase 1980, Benda et al. 2006 for reviews) do not seem to reflect the evolutionary history of the species.

Rhinolophus hipposideros (Borkhausen, 1797)

Records. **Original data**: S o u t h e r n C y p r u s: Kakopetria, Troodos Forest, abandoned mine 4.5 km to SW [1], middle gallery, 29 March 2005: coll. 1 ma (NMP 91263 [A]); – Kakopetria, Troodos Forest, abandoned mine 5 km to SW [2], upper gallery (Fig. 10), 13 October 2005: net. 2 ma, 1 fa, 2 fs/j, det. ca. 8 ind. around the mine entrance; 14 October 2005: net. 1 ms (NMP 91229 [A]); 27 July 2006: net. 3 ma, 1 ms/j, 2 fa, 1 fs/j (coll. 6 inds., NMP 90924–90928 [S+A], 90923 [A]); – Neo Horio, Smigies Trail ca. 3 km to NW [3], abandoned chromite mine system 'Magnesia Mine', 27 March 2005: coll. 2 ma, 2 ms, 2 fs (NMP 91247, 91821–91825 [A]); 12 October 2005: det. 1 ind.; 21 July 2006: obs. & det. 1 flying ind. in the mine; – Troodos, Troodos Forest, abandoned chromite mine 1.5 km to N [4], 29 March 2005: coll. 3 ma (NMP

91261, 91262, 91827 [A]); 13 October 2005: net. 1 ma, 1 ms; – Troodos, Troodos Forest ca. 3 km to W [5], Hadjipavlou mine (Fig. 16), 14 October 2005: net. 1 fs, det. 1–2 inds. – N o r t h e r n C y p r u s: Çınarlı, Inçirli cave ca. 4 km to SE [6], 6 April 2005: net. 1 ma, 1 ms (NMP 91269 [S+A], 91270 [A]), det. 1 ind.; 17 April 2005: net. 1 ma (NMP 90424 [S+A]) and det. 2 inds. at a front of the cave, 1 ind. obs. inside the cave; 15 October 2005: net. 1 fs/j (NMP 91830 [A]), det. 1 ind. in an orchard behind the cave ridge; – Hagios Epittito (Cipro) [= Agios Epiktitos] [7], 15 January 1899: 1 ma (MSNF 9136 [S+A]; leg. Cecconi); – Trikomo (Cipro) [8], 10 January 1899: 1 ma (MSNF 9135 [S+A]; leg. Cecconi). – C y p r u s: Cipro [= Cyprus], 1 ms, 3 fs (MSNF 9131–9134 [S+A]). – **Published data**: S o u t h e r n C y p r u s: Akamas peninsula [cf. 3], cave, obs. 1 ind. (Boye et al. 1990); 1 ind. found dead in a bush (Boye et al. 1990); – Kavasos [?= Kalavasos] [9] (Larnaca/Limasol), mine (cf. Fig. 11), 25 April 2001: 7 m, 3 f, 1 ind. (Heller et al. 2001); – Limassol [= Lemesos], a cave to N [10], 26 March 1989: obs. colony of 29 inds. (Boye et al. 1990); – Lythrodhonda [= Lythrodontas], Kloster des Propheten Elias [= Moni Profiti Ilia] [11], abandoned monastery (Nicosia), 18 May 1972: nurs. colony of ca. 12 f (Spitzenberger 1979); – Pano Lefkara [12], greater vicinity, June 1988: obs. colony of 70–100 inds. [20–25 fa with youngs] (Boye et al. 1990); – Prastiou [= Prastio] [13], mine, 31 March 1973 (Spitzenberger 1979; – Stavros tis Psokas [14], old house, 1987: small colony of 8 inds. [species identification unclear] (Reinhold 1987, in litt.). – N o r t h e r n C y p r u s: Lounata Springs [15], half-cave (Kyrenia), 24 March 1973: 1 ind. (NMW 23473 [Sk]) (Spitzenberger 1979); – Palea [= Palaia] Vrysi [16], small fissure cave (Kyrenia), 24 March 1973: 5 m, 1 ind. (coll. 3 m, NMW 23470–23472 [S+B]) (Spitzenberger 1979). – C y p r u s: Cipro [= Cyprus], 1 ind. (Doria 1887); – Cyprus; common, found in caves (Bate 1903) ?= Cyprus, 6 inds. (Andersen 1905) = 5 f, 1 m (Andersen 1907); – Zypern [= Cyprus], before 1858, 1 ind. (Bauer in Spitzenberger 1979).

Comments. According to the number and distribution of records, *Rhinolophus hipposideros* is the most widespread bat species and the third most frequently recorded bat in Cyprus (Table 1). At least 15 detailed record sites, covering wide range of altitudes (ca. 26–1665 m a. s. l.; mean 650 m), are known from all parts of the island (Fig. 12). Already Bate (1903) reported *R. hipposideros* as common in Cyprus. The first note on this species from the island was published by

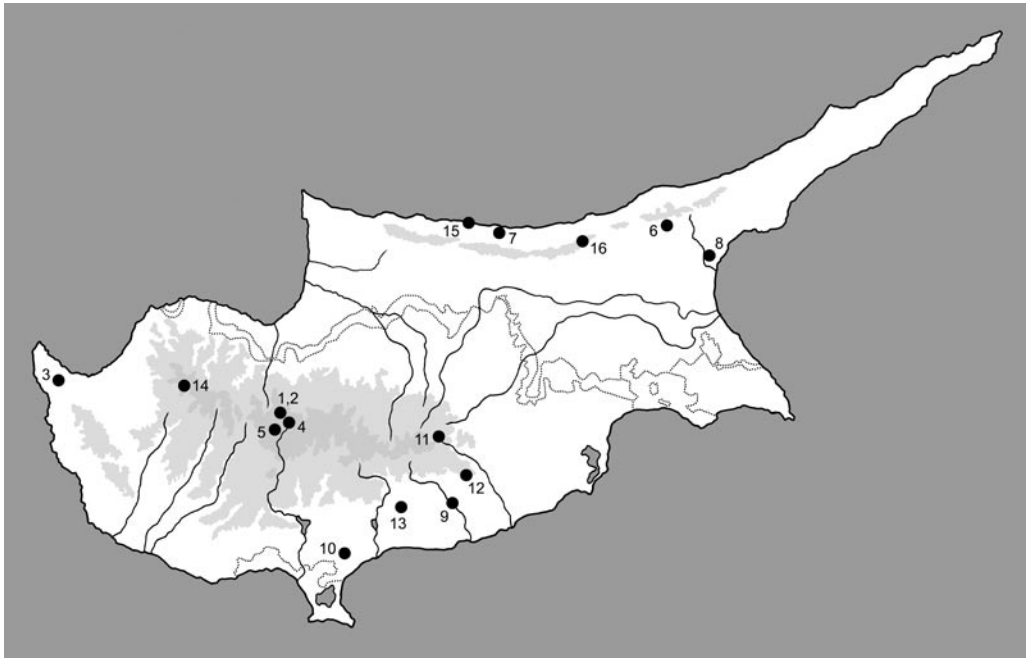


Fig. 12. Records of *Rhinolophus hipposideros* (Borkhausein, 1797) in Cyprus.

Doria (1887), although a probably older record made before 1859 was mentioned by Bauer (in Spitzenberger 1979)*.

With the exception of a colony located in the ruined monastery of Elias the Prophet (Spitzenberger 1979), all records come from underground roosts (caves or mines), where the bats were observed (8 records) or netted/detected at their entrances (17) (Figs. 7, 10, 16). At least six record sites could be considered maternity roosts according to direct observations of colonies with young or to the reproductive status of examined individuals (see Records).

Andersen (1918) and later Bauer (in Spitzenberger 1979) revised the taxonomic status of the Cypriot populations of *R. hipposideros*; both analyses showed them to belong to *R. h. midas* Andersen, 1905, a subspecies described from Jask in the Persian Gulf (Iran). These conclusions based mostly on skull morphology were compatible with preliminary results of molecular genetic analysis (Kůs et al. in prep.). They showed the Cypriot samples to be very close to those of the Levant, and this common Cypriot-Levantine clade was sister to the European-Cretan clade (at about 3% of genetic distance). This result placed the Cypriot populations of *R. hipposideros* into close proximity of the Middle Eastern ones. This pattern is distinct from that found in *R. ferrumequinum*, where an affinity to Cretan and European populations was detected, see above (although a smaller sample was available for analysis than in *R. hipposideros*). External and cranial dimensions of the examined Cypriot specimens of *R. hipposideros* are shown in Appendix III.

Rhinolophus euryale Blasius, 1853

Records. **Published data**: S o u t h e r n C y p r u s: Limassol [= Lemesos], a cave to N, 26 March 1989: visual obs. 1 m, 1 ind. (Boye et al. 1990). – C y p r u s: Cyprus (Theodor 1967).

Comments. Harrison (1964: 88) in his map of the distribution of *Rhinolophus euryale* in Arabia mentioned also a point in Cyprus, however, without giving an exact locality or any source of this information and moreover, he did not include Cyprus in the species' general distribution (p. 90). DeBlase (1972: 7) summarised the situation as follows: "Harrison (1964, 88) mapped *R. euryale* from Cyprus but provided no data to substantiate this dot. I have found no other reference to either of these species on Cyprus and have not seen no specimens from this island." DeBlase (1972) and also Spitzenberger (1979) overlooked the record by Theodor (1967), who, however, might have mentioned the same individual, referred in the map by Harrison (1964). On the other hand, since Harrison (1964) did not report *R. mehelyi* from Arabia, he might have actually referred to this closely related species from Cyprus instead of *R. euryale*, based on the imprecise reports by Kahmann & Çağlar (1959, 1960), see below.

Anyway, the first record of *R. euryale* in its contemporary sense from Cyprus was reported by Boye et al. (1990). They observed two individuals in a cave inhabited by colonies of other bat

* Note. Bauer in Spitzenberger (1979: 450) mentioned a note on the first possible specimen of *R. hipposideros* from Cyprus: "Den frühesten, nicht genauer lokalisierten Nachweis der Kleinen Hufeisennäse für Zypern stellt ein Exemplar dar, das 1858 vom Wiener Naturalienhändler Ludwig Parreys gekauft und von Leopold Fitzinger unter dem (damals noch) Manuskriptnamen *Rhinolophus minimus* (publiziert erst 1861 durch Heuglin) registriert wurde. Das Belegstück (Acqu.-Nr. 1858/II/6) ist in der Sammlung nicht mehr nachzuweisen." Bauer determined the Fitzinger's specimen as *R. hipposideros*, since he co-identified the name *R. minimus* Fitzinger (nomen nudum) with *R. minimus* von Heuglin, 1861, contemporarily considered a synonym of *R. hipposideros* (Andersen 1907, Ellerman & Morrison-Scott 1951, Felten et al. 1977, Simmons 2005, etc.). However, elsewhere, Fitzinger (1870) noted under *R. clivosus* (= *R. blasii*) from Cyprus: "Einige sehr junge Individuen, die Jan von der Insel Cypern erhielt, veranlaßten ihn zur Aufstellung einer besonder Art, die er im zoologischen Museum zu Mailand mit dem Namen '*Rhinolophus minimus*' bezeichnet hatte". Although Fitzinger (1870) described (most likely) different specimens than noted by Bauer (in Spitzenberger 1979), he mentioned a use of the name *R. minimus* in connection with the present species *R. blasii*. Since Bauer could not revise the respective specimen of '*R. minimus*', it cannot be excluded that this lost specimen might actually belong to a different species than *R. hipposideros*.

species (*Rhinolophus hipposideros*, *Miniopterus schreibersii* and perhaps other rhinolophids), however, did not give any measurements or other data to support this record. Although the presence of *R. euryale* is well possible in Cyprus, taking into account its distribution in the surrounding Levantine countries (Hasbenli 1997, Benda & Horáček 1998, Benda et al. 2006, Shehab et al. 2007), the record based only on visual observation could well be misidentified. However, Kryštufek & Vohralík (2001) accepted the record by Boye et al. (1990) without any doubts.

DeBlase (1972) and Benda et al. (2006) documented a number of primarily erroneously determined records of medium-sized horseshoe bats from the Middle East, including the type series of the name *Euryalus judaicus* Andersen et Matschie, 1904, described from Palestine. This name was for a long time considered a synonym of *R. euryale* (e.g. Ellerman & Morrison-Scott 1951, Csorba et al. 2003, Simmons 2005, etc.) and suggested to classify the East Mediterranean populations of this bat as a valid subspecies (for details see Benda et al. 2006: 71–75), but later it was shown to be a synonym of *R. mehelyi*. As pointed out by Felten et al. (1977) and Benda et al. (2006), representatives of the Levantine populations of *R. euryale* and *R. mehelyi* are smaller than those of the European ones, and an average sized *R. mehelyi* from the Levant only slightly oversizes in its external measurements the typical *R. euryale*. On the other hand, according to a simple comparison of several skull dimensions and characters, the correct species determination is well possible (Benda et al. 2006: 66–71).

Since *R. mehelyi* is the only species of the sibling pair of horseshoe bats which has been confirmed to occur in Cyprus (see Felten et al. 1977), we consider the Cypriot distribution of *R. euryale* only tentative, until it is confirmed by an undoubted revision of a skeletal material.

Rhinolophus mehelyi Matschie, 1901

Records. **Published data**: N o r t h e r n C y p r u s: Kyrenia, 1 ind. (SKM 2808) (Felten et al. 1977). – C y p r u s: [Cyprus] point in a map, without any details (Kahmann & Çağlar 1959); – 'Insel Cypern [= Cyprus] (Kahmann, unveröff.)' (Kahmann & Çağlar 1960).

Comments. *Rhinolophus mehelyi* was for the first time reported to occur in Cyprus by Kahmann & Çağlar (1959, 1960). These non-specific reports were accepted by DeBlase (1972: 7) in his revision of distribution of *R. mehelyi* in the Middle East: "Kahmann & Çağlar (1960) mentioned the occurrence of *R. mehelyi* on Cyprus and mapped a locality for this species on that island. [...] No measurements or description are provided but I have no reason to doubt Kahmann's identification." The correct determination of the Kahmann's record was later verified by Felten et al. (1977) who published also the collection site of the revised specimen. However, this individual remains the only representative of *R. mehelyi* reported from the island and thus, the actual extent of the species' distribution in Cyprus should be specified by further research (see also the comments on *R. euryale*).

Rhinolophus blasii Peters, 1866

Records. **Original data**: S o u t h e r n C y p r u s: Kakopetria, Troodos Forest, abandoned mine 5 km to SW [1], upper gallery (Fig. 10), 27 July 2006: net. 2 fa (NMP 90929, 90930 [S+A]); – Kalavasos, abandoned mine ca. 3 km to NW [2; Fig. 11], 19 April 2005: net. 1 ma (NMP 90433 [S+A]); 28 July 2006: obs. & det. 1 ind. – N o r t h e r n C y p r u s: Фамагуста [Famagusta] [3], о. Кипр [o. Kipr = island of Cyprus], 1875: 1 fa (ZIN 5945 [A], leg. H. Rolle). – **Published data**: S o u t h e r n C y p r u s: Lekara [?= Lefkara] [4], Cyprus, April 1894: 4 fa (BMNH 94.12.1.1.– 94.12.1.4. [S+A]; presented by Lord Lilford) (Andersen 1906, cf. Bate 1903); – Paphos [= Pafos] district [5], cave, 12 March 1989: 3 inds. (Boye et al. 1990), 22 March 1989: 8 or more inds. (Boye et al. 1990), December 1989: 1 ind. (Boye et al. 1990); – Paphos [= Pafos] district [6], other cave, March and December 1989: colony of more than 100 inds. (Boye et al. 1990), May

Fig. 13. Records of *Rhinolophus blasii* Peters, 1866 in Cyprus.

1990: colony of 180–200 inds. (Boye et al. 1990); – between Pyla and Troulli [= Troulloi] [7] (Larnaca), January–July 1977: 2 m (NMW 23381, 23382 [S+B]; leg. K. Kollnberger) (Spitzenberger 1979). – N o r t h e r n C y p r u s: Kyrenia [8], 1 ind. (SKM 2810) (Felten et al. 1977). – C y p r u s: isola di Cipro [= Cyprus], 1 es. [MSNF] (Lanza 1959); – Insel Cypern [= Cyprus] (as *R. clivosus*) (Fitzinger 1870); – Cyprus, 5 inds. (Sanborn & Hoogstraal 1953).

Comments. *Rhinolophus blasii* is one of the more frequently recorded bat species and the most commonly recorded medium-sized horseshoe bat in Cyprus (see Table 1), 11 records are available from the island, eight of them being precisely localised (Fig. 13). Similarly as in other more frequently found rhinolophids (*R. ferrumequinum*, *R. hipposideros*), records of *R. blasii* cover all parts and altitudes of Cyprus; the findings come from the range of 15–1665 m a. s. l. However, the mean altitude of 386 m rather suggests a preference of lower situated localities. All detailed records are connected with underground spaces. The Cypriot occurrence of *R. blasii* extends its documented Levantine distribution in the belt from southern Turkey to northern Israel (Benda & Horáček 1998, Benda et al. 2006, our unpubl. data from Lebanon) as well as the Balkans and Crete (Hanák et al. 2001). External and cranial dimensions of the examined Cypriot specimens of *R. blasii* are shown in Appendix III.

Myotis blythii (Tomes, 1857)

Records. **Original data**: S o u t h e r n C y p r u s: Kakopetria, Troodos Forest, abandoned mine 4 km to SW [1], lower gallery (Fig. 38), 15 October 2005: coll. 1 ms (NMP 91230 [S+A]). – N o r t h e r n C y p r u s: Çınarlı, Inçirli cave ca. 4 km to SE [2], 17 April 2005: net. 1 ma (NMP 90426 [S+A]). – **Published data**: S o u t h e r n C y p r u s: between Pyla

and Troulli [= Troulloi] [3] (Larnaca), January–July 1977: 1 m, 2 f (NMW 22383–22385 [3 S, 1 B, 2 Sk, 1 A]; leg. K. Kollnberger) (Spitzenberger 1979); – Troodos Mts, more than 1500 m a. s. l., cave, December 1989: 1 f (Boye et al. 1990).

Comments. *Myotis blythii* is a rather rare bat species in Cyprus, with only four accurately identified records available. Although scarce, the records of *M. blythii* come from all parts of Cyprus (Fig. 14), including lowland and higher mountain sites, with the approximate altitude range of 120–1500 m a. s. l. (mean 791 m). All three more precisely described records come from underground spaces (two caves and a mine).

Unger & Kotschy (1865) reported an occurrence of *Vespertilio murinus* Schreb[er]. (= *Vespertilio myotis* Borkhausen, 1797 [= *Myotis myotis*]) from Cyprus, however, they did not give any details on the record/s and no museum specimens are available in their collection (Spitzenberger 1979). As they mentioned only two bat species (incl. *R. aegyptiacus*), the name *V. murinus* could denote any species of a mouse-like insectivorous bat. However, Bate (1903: 342) mentioned under *Myotis myotis*: "This species is included in Unger and Kotschy's list under the name of *Vespertilio murinus* Schreb., but was not amongst those I procured.", i.e., she accepted the species identification (as the species *M. blythii* was not commonly distinguished from *M. myotis* at that time). Strelkov (1972) suggested occurrence of *M. blythii* in Cyprus that was, however, confirmed first by Spitzenberger (1979).

Spitzenberger (1979) also identified the subspecies to which the Cypriot population pertains, *M. blythii omari* Thomas, 1905. This form commonly occurs in all surrounding mainland areas (Spitzenberger 1996, Benda et al. 2006). Our specimens fit well by their skull size into the variation range of *M. b. omari* from the Middle East; external and cranial dimensions of these specimens are shown in Appendix III (see the comparison by Benda et al. 2006).

Fig. 14. Records of *Myotis blythii* (Tomes, 1857) in Cyprus.

Myotis nattereri (Kuhl, 1817)

Records. **Original data**: S o u t h e r n C y p r u s: Agios Nikolaos, Diarizos river ca. 3 km to N, Kelefou bridge [1; Fig. 24], 16 April 2005: det. 2 inds.; – Apliç, inflow of the Setrahos river into a dam ca. 4 km to S [2], 15 April 2005: net. 1 fa (NMP 90418 [S+A]); – Kakopetria, Troodos Forest, abandoned mine 5 km to SW [3], upper gallery (Fig. 10), 13 October 2005: net. 1 ms (NMP 91208 [S+A]); 14 October 2005: net. 1 ma, 2 ms (NMP 91226 [S+A], 91227 [A]); – Kakopetria, Troodos Forest, abandoned mine 4 km to SW [4], lower gallery (Fig. 38), 15 October 2005: coll. 1 fs (NMP 91231 [A]); – Neo Horio, Smigies Trail ca. 3 km to NW [5], abandoned chromite mine system 'Magnesia Mine', 27 March 2005: net. 2 ma (NMP 91251, 91252 [S+A]); – Troodos, Troodos Forest, abandoned chromite mine 1.5 km to N [6], 13 October 2005: net. 2 ma, 2 ms, 4 fs (NMP 91213–91217 [S+A], 91211, 91212, 91218 [A]); – Troodos, Troodos Forest 3 km to W [7], Hadjipavlou mine (Fig. 16), 14 October 2005: net. 3 ms (coll. 2 inds., NMP 91222 [S+A], 91221 [A]), obs. & det. ca. 2–3 inds. – N o r t h e r n C y p r u s: Çınarlı, Inçirli cave ca. 4 km to SE [8], 6 April 2005: net. 3 faG (NMP 91272, 91273 [S+A], 91271 [A]); 17 April 2005: net. 4 fa (NMP 90429, 90430 [S+A], 90427, 90428 [A]); 15 October 2005: net. 1 ms, 1 fs (NMP 91232, 91233 [S+A]), det. 1 ind.; – Kantara, Kantara castle ruins 3 km to NE [9; Fig. 18], 16 October 2005: net. 1 ma. – **Published data**: S o u t h e r n C y p r u s: Akamas [cf. 5], cave, May 1990: 1 ind. (Boye et al. 1990); – Pano Panayia [= Pano Panagia] [10], cave (Paphos), 1 m (Boye et al. 1990); – Paphos [= Pafos] district [11], cave, May 1990: 2 f, 1 ind. (Boye et al. 1990).

Comments. Although *Myotis nattereri* has been discovered to inhabit Cyprus relatively recently (Boye et al. 1990), according to our experience, it represents one of the most widespread bats of the island. Altogether, it has been recorded at least at 11 sites, covering all parts and altitudes of the island (Fig. 15). The altitude range of the record sites is 240–1665 m a. s. l. (mean 855 m), which suggests a general use of the island's habitats. Netting data prevail in our original records, with one finding of a torpid individual in a mine. Individuals of *M. nattereri* were netted only during spring and autumn, mostly at entrances of abandoned mines (e.g., Hadjipavlou mine, see

Fig. 15. Records of *Myotis nattereri* (Kuhl, 1817) in Cyprus.

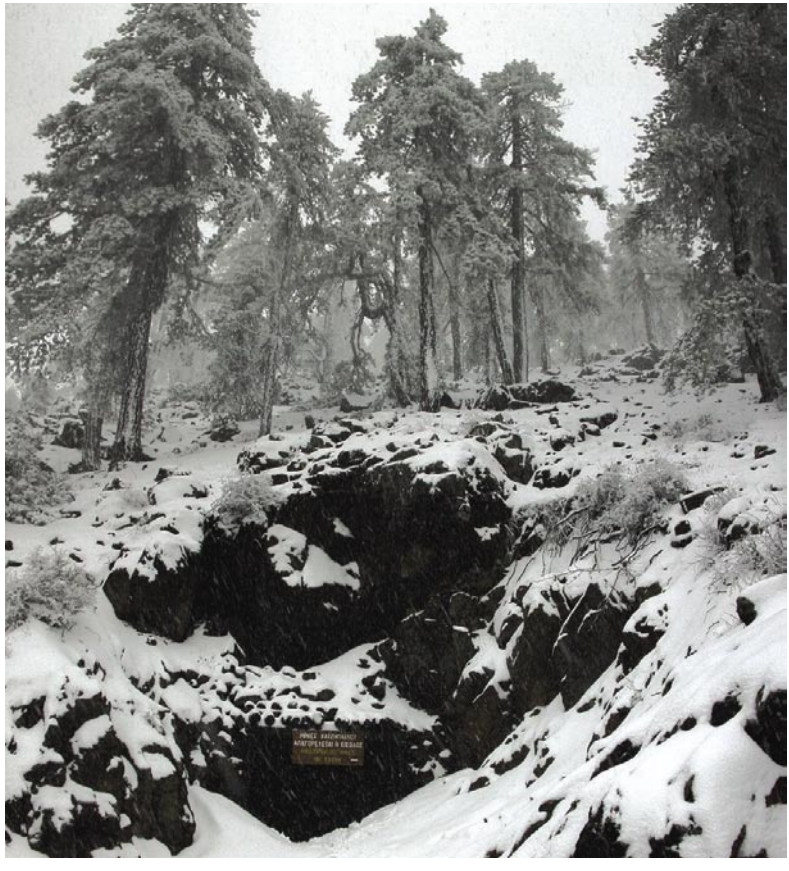


Fig. 16. Entrance to the abandoned Hadjipavlou mine in the Troodos Forest 3 km west of Troodos, at ca. 1630 m a. s. l. (the picture was made on 5 April 2005; photo by I. Horáček). A rich bat community was found there on 14 October 2005; *Rhinolophus ferrumequinum*, *R. hipposideros*, *Myotis nattereri*, *Eptesicus serotinus*, *Hypsugo savii*, and *Plecotus kolombatovici* were netted and calls of *Pipistrellus kuhlii* and *Tadarida teniotis* recorded.

Fig. 16) plus one cave entrance, once above a water stream and once in ruins of a mediaeval castle. At the entrance of the Inçirli cave, we netted three females of *M. nattereri* in a high stage of pregnancy, during their evening emergence from the cave. This record suggests the use of caves as roosts even by nursery colonies of this species in Cyprus.

The occurrence of *M. nattereri* in Cyprus well extends its distribution along the coast of the Levantine Sea from SW Turkey to Israel (see the review by Benda et al. 2006: 112), representing a slightly isolated part of its distribution range. External and cranial dimensions of the Cypriot specimens of *M. nattereri* are shown in Appendix III.

Myotis emarginatus (Geoffroy, 1806)

Records. **Original data**: S o u t h e r n C y p r u s: Kakopetria, Troodos Forest, abandoned mine 5 km to SW [1], upper gallery (Fig. 10), 29 March 2005: coll. 1 fs (NMP 91264 [S+A]), 11 April 2005: coll. 2 fa (NMP 90400, 90401 [S+A]);

13 October 2005: det. 1 ind.; 27 July 2006: net. 8 ma (coll. 6 inds., NMP 90931–90935 [S+A], 90936 [A]); – **Published data**: S o u t h e r n C y p r u s: Kavasos [?= Kalavasos] [2] (Larnaca/Limasol), mine (cf. Fig. 11), 25 April 2001: net. 13 f ("many animals obviously pregnant"), 1 ind. (Heller et al. 2001).

Comments. Since *Myotis emarginatus* has been reported only from two sites, it represents one of the rarest bat species of Cyprus. However, the bat was recorded four times at one of these sites, an abandoned mine in the Troodos Forest at 1665 m a. s. l. (Fig. 10); it was twice evidenced to forage at the entrance (once a larger group was netted) and twice it was found torpid inside this mine (a straight gallery, ca. 50 m long). The only previous Cypriot record by Heller et al. (2001) was also obtained by netting at mine entrance (at ca. 130 m a. s. l.; Fig. 11), however, it undoubtedly represented a record of a nursery colony. External and cranial dimensions of the Cypriot specimens of *M. emarginatus* are shown in Appendix III.

Myotis capaccinii (Bonaparte, 1837)

Records. **Published data**: N o r t h e r n C y p r u s: Kyrenia, 19 May 1960: 1 ind. (SKM 2809; leg. H. Kahmann) (Kock 1974). – C y p r u s: Kıbrıs [= Cyprus], without any close details (Kahmann & Çağlar 1959) = "Cypern [= Cyprus] (Kahmann, unveröff.)" (Kahmann & Çağlar 1960).

Comments. Harrison (1964: 130) in his map of the distribution of *Myotis capaccinii* in Arabia mentioned also a record in Cyprus. He reported Cyprus among countries covering the range of this species, but did not give an exact locality or any information source. However, this mention undoubtedly reflected indirect reports of *M. capaccinii* from Cyprus by Kahmann & Çağlar (1959, 1960) as Spitzenberger (1979) already suggested. The Kahmann's & Çağlar's reports could be most probably based on the specimen labelled to be originating from Cyprus and published by Kock (1974) (see also comments by Kock 1974 and Boye et al. 1990).

The occurrence of *M. capaccinii* in Cyprus can be considered likely since the species is present in the mainland regions neighbouring to Cyprus, i.e. in southwestern Turkey and the Levant (Karataş et al. 2003a, Benda et al. 2006, Shehab et al. 2007). Nevertheless, the Kahmann's record seems to be rather doubtful for two reasons; (1) its first indirect mention, the paper by Kahmann & Çağlar (1959), was issued a year before the Kahmann's finding of this bat in Cyprus (although it could be theoretically based on a different older record), and (2) according to the data by Kock (1974) and Felten et al. (1977), the respective bat should have been collected at Kyrenia on 19 May 1960, i.e. two days before other two individuals of *M. capaccinii* were collected in Crete (Piskokefalo, 21 May 1960; Kock 1974, cf. Kahmann & Çağlar 1959, 1960). As there was no direct flight connection between Cyprus and Crete in the 1960s, the combined flight and/or ship and car transport between Kyrenia and Piskokefalo undoubtedly required more than two days. *M. capaccinii* is a bat species confirmed to occur in Crete (Gefyra Petre near Dramia, 1 fa, NMP 91093, 6 October 2006, our unpubl. data), and thus, the record from Cyprus seems to be rather doubtful under these circumstances (some other published faunal data by H. Kahmann had been considered doubtful too*, giving support to our preliminary conclusion). On the other hand, these discrepancies could be caused also by erroneous publication of the collection dates (Kock 1974), however, this possibility was excluded by D. Kock (ad verb.).

* Note. Dr. Dieter Kock (in litt. & ad verb.) pointed out a poor credibility of some distribution data published by Professor Heinrich Kahmann (Munich). His records of *Eliomys melanurus* (Wagner, 1840) in an inaccessible part of Saudi Arabia (Kahmann 1981; for details see Nader et al. 1983), the record of a nursery colony of *Hypsugo savii* (Bonaparte, 1837) at a mountain hut in southern Bavaria in 1950s (Kahmann 1958), the records of *Apodemus agrarius* (Pallas, 1771) in eastern Austria (Kahmann 1961; see Spitzenberger 1997) as well as the above discussed record of *M. capaccinii* in Cyprus are for more reasons considered to be quite dubious and rather unlikely. Although some of these records seem to be possible when taking the entire respective distribution range into account, a detailed assessment of their circumstances rather degrades their reliability.

Hadjisterkotis (2006) discussed a possible extinction of *M. capaccinii* in Cyprus, arguing by the lack of recent records. However, such absence of records could be caused by a primary absence of this bat on the island as suggested by the above analysis of the only known record. Although we cannot exclude a possibility that *M. capaccinii* really occurs in Cyprus, this occurrence needs to be confirmed. Despite our relatively extensive research in Cyprus (netting and detecting at cave entrances and above water bodies as well as checks of underground spaces in various seasons), we did not record any evidence of this conspicuous trawling bat on the island.

Eptesicus serotinus (Schreber, 1774)

Records. **Original data**: S o u t h e r n C y p r u s: Agios Nikolaos, Diarizos river ca. 3 km to N, Kelefou bridge [1; Fig. 24], 16 April 2005: det. 1 ind.; – Troodos, Kryos river ca. 2 km to SW [2], upper end of the Kalidonia Trail (Fig. 25), 13 April 2005: net. 1 ma (NMP 90409 [S+A]); – Troodos, Troodos Forest, at an abandoned chromite mine 1.5 km to N [3], 13 October 2005: obs. & det. 1 ind.; – Troodos, Troodos Forest ca. 3 km to W [4], Hadjipavlou mine (Fig. 16), 14 October 2005: net. 1 ma (NMP 91219 [S+A]); – N o r t h e r n C y p r u s: Gazimağusa [5], citadel, 25 July 2006: obs. 5 inds. in vault fissures, coll. 1 fa (NMP 90919 [S+A]). – **Published data**: C y p r u s: Zypern [= Cyprus], without any closer site of finding, 1 mj, 2 fj (1 m, NMW 24029 [S+A]) (Spitzenberger 1979).

Comments. *Eptesicus serotinus* was for the first time reported from Cyprus by Spitzenberger (1979); she found three specimens in the collection of the Plant Protection Laboratory of the Ministry of Agriculture and Natural Resources in Lefkosia. Since at the time of Spitzenberger's visit, the island was not yet politically divided, the possible origin of these specimens might cover all parts of Cyprus.

Fig. 17. Records of *Eptesicus serotinus* (Schreber, 1774) (closed symbols) and *E. anatolicus* Felten, 1971 (open symbol) in Cyprus.

Fig. 18. Kantara castle ruins (3 km northeast of the Kantara village) at ca. 625 m a. s. l., overlooking the Karpaz peninsula in northeastern Cyprus (view to the east). In the ruins, *Myotis nattereri*, *Eptesicus anatolicus*, *Hypsugo savii*, and *Pipistrellus kuhlii* were recorded (photo by I. Horáček).

Here, we present the first accurately localised records of *E. serotinus* from Cyprus; five such findings are available, including three voucher specimens (Fig. 17). The altitude range of the records is relatively wide, 15–1630 m a. s. l., however, the mean altitude (1034 m) rather suggests preference of higher locations. With an exception of one finding in synanthropic conditions (Gazimağusa citadel), the remaining bats were collected in the Troodos Mts at the altitude of around 1600 m a. s. l. The record made in the citadel of Gazimağusa, represented by several bats found scattered throughout the ruin inside the town (one adult female examined) in the second half of July, suggests a find of a recently dispersed nursery colony. It conforms to the preference of synanthropic roosts known for this bat in other parts of its distribution range. Since the mountain records were adult males found in transient periods of the year, i.e. possible seasonal migrants, the island's habitats seem to be used by *E. serotinus* continually at all altitudes.

External and cranial dimensions of the examined Cypriot specimens of *E. serotinus* are shown in Appendix III. According to skull size, the Cypriot populations belong to the Levantine-Zagrosian form, tentatively named *E. s. shiraziensis* (Dobson, 1871), oversizing the nominotypical form from Europe and the northern part of Anatolia as well as the Maghrebian *E. s. isabellinus* (Temminck, 1840) and Central Asian *E. s. turcomanus* (Eversmann, 1840) (for details see the analysis by Benda et al. 2006).

Eptesicus anatolicus Felten, 1971

Records. **Original data**: N o r t h e r n C y p r u s: Kantara, Kantara castle ruins 3 km to NE [1; Fig. 18], 25 July 2006: coll. 1 ma (NMP 90922 [S+A]).

Comments. We regard *Eptesicus anatolicus* a separate species, in accordance with the results of morphological and genetic analyses (Benda et al. 2006, Mayer et al. 2007). *E. anatolicus* is here reported from Cyprus for the first time; an adult male was netted in the Kantara castle ruins (625 m a. s. l.; Fig. 18) on the eastern edge of the Beşparmak (= Pentadaktylos) range (Fig. 17). The occurrence of this species in Cyprus was well predictable, since *E. anatolicus* represents a rather common faunal element along the coast of the Levantine Sea from Rhodes (Greece) in west to Lebanon in southeast (Spitzenberger 1994, von Helversen 1998, Benda et al. 2006,

our unpubl. data). External and cranial dimensions of the Cypriot specimen of *E. anatolicus* are shown in Appendix III.

Hypsugo savii (Bonaparte, 1837)

Records. **Original data**: S o u t h e r n C y p r u s: Kakopetria, Troodos Forest, abandoned mine 5 km to SW [1], upper gallery (Fig. 10), 13 October 2005: net. 1 ma (NMP 91210 [S+A]); – Neo Horio, Petratis gorge ca. 4 km to E [2], 25 March 2005: det. 1 ind.; – Neo Horio, Smigies Trail ca. 3 km to NW [3], at the abandoned chromite mine system 'Magnesia Mine', 9 April 2005: det. 1 ind.; 12 October 2005: det. 2 inds. of cf. *H. savii*; – Prodromi, Androlikou gorge ca. 2 km to SW [4], 20 April 2005: det. min. 1 ind.; – Troodos, Kryos river ca. 2 km to SW [5], upper end of the Kalidonia Trail (Fig. 25), 13 April 2005: net. 1 ma (NMP 90410 [S+A]); – Troodos, Troodos Forest, at an abandoned chromite mine 1.5 km to N [6], 13 October 2005: det. 3–5 inds.; – Troodos, Troodos Forest ca. 3 km to W [7], Hadjipavlou mine (Fig. 16), 14 October 2005: net. 1 fa (NMP 91220 [S+A]), obs. & det. ca. 3 inds.; – Troodos, Troodos Forest, small pools 3 km to NNW [8], 11 April 2005: net. 1 ma (NMP 90407 [S+A]). – N o r t h e r n C y p r u s: Kantara, Kantara castle ruins 3 km to NE [9; Fig. 18], 18 April 2005: coll. 1 ma (NMP 90431 [S+A]). – **Published data**: S o u t h e r n C y p r u s: Troodos Mts [cf. 1, 5–8], 9 July 1911: 1 ma (BMNH 11.12.16.2 [S+A]) (Harrison 1961, cf. Thomas in Spitzenberger 1979).

Comments. Although the first individual of *Hypsugo savii* in Cyprus was collected relatively early (July 1911; see Harrison 1961), it remained the only record of this bat from the island for almost a century (see Spitzenberger 1979, Boye et al. 1990). However, according to our experience, *H. savii* represents one of the most widespread bats in higher altitudes of Cyprus (Fig. 19); altogether ten sites of its occurrence have been recorded. The records come mostly from mountainous habitats of the island – mean altitude being 1206 m a. s. l., although the record sites cover a relatively wide range of altitudes (255–1770 m). In our original records, detectoring (5 records) and

Fig. 19. Records of *Hypsugo savii* (Bonaparte, 1837) in Cyprus.

netting (4) data prevail, with only one finding of an individual in a day roost (a male was found in wall fissure of the mediaeval castle ruins of Kantara in the Beşparmak (= Pentadaktylos) Mts, 625 m a. s. l.; Fig. 18). Calls and individuals of *H. savii* were recorded mostly in spring and autumn transient periods, the only summer record was published by Harrison (1961). (According to Spitzenberger 1979, this record was primarily published by Oldfield Thomas in the *Annals of the Cyprus Natural History Society*, but this report remained overlooked for a long time.) The preference of highland habitats by *H. savii* in Cyprus corresponds well to the known distribution of the Levantine populations (Benda et al. 2006); also in Asia Minor this bat represents a rather continental faunal element (Benda & Horáček 1998). External and cranial dimensions of the examined Cypriot specimens of *H. savii* are shown in Appendix III.

Pipistrellus pipistrellus (Schreber, 1774)

Records. **Original data**: S o u t h e r n C y p r u s: Kakopetria, Troodos Forest, abandoned mine 5 km to SW [1], at the upper gallery (Fig. 10), 13 October 2005: det. 1–2 ind. [46–49 kHz]; – Troodos, Kryos river ca. 2 km to SW [3], upper end of the Kalidonia Trail (Fig. 25), 5 September 2000: net. 1 m (MHNG 1807.089 [S+A]).

Pipistrellus pipistrellus s. l.

Records. **Original data**: S o u t h e r n C y p r u s: Troodos, Kryos river ca. 2 km to SW [3], upper end of the Kalidonia Trail, 5 September 2000: net. 2 m, 1 f (together with collected 3 m; from which one 1807.089 was identified as *P. pipistrellus*, while other two 1807.090, 1807.091 as *P. pygmaeus*); 22 July 2006: net. 1 ind.

Comments. *Pipistrellus pipistrellus* s. str. is here reported from Cyprus for the first time; its identification has been confirmed by genetic analysis of the mitochondrial gene for cytochrome *b* (see Appendix II). The only individual was found among six bats of the *P. pipistrellus* group caught in 2000, two other males from this group were identified as *P. pygmaeus*, while another five bats of the latter species were netted at the same site five years later. In the whole catch of bats of this group from Cyprus, the only identified specimen of *P. pipistrellus* was found against 13 genetically determined specimens of *P. pygmaeus* (from three sites, a half of this number from the same site where *P. pipistrelus* was caught). It suggests that *P. pipistrellus* is a species with a lower population density in Cyprus than *P. pygmaeus*. However, the population of *P. pipistrellus* certainly persists on the island, since its echolocation calls were recorded in autumn 2005*.

Both sites of *P. pipistrellus* records in Cyprus lie in its highest mountainous parts (Fig. 20), at the altitudes of 1595 and 1665 m a. s. l., respectively. These data suggest preference of higher situated and/or forested areas of Cyprus in this bat. The scarcity of findings of *P. pipistrellus* in Cyprus is quite surprising, since in the Mediterranean parts of the Levant this species is rather common (Benda et al. 2006, our unpubl. data from Lebanon) as well as the bats of the *P. pipistrellus* group in southwestern Turkey (Benda & Horáček 1998, Karataş et al. 2004).

The single specimen of *P. pipistrellus* available from Cyprus does not generally differ in morphology (skull and tooth characters and sizes) from the conspecifics of the Middle East and/or Europe (see Figs. 21–23). External and cranial dimensions of this specimen are shown in Appendix III. The haplotype of this bat (first 402 bp of the mitochondrial gene for cytochrome *b*;

* Note. Hanák et al. (2001: 315) suggested occurrence of *P. pipistrellus* s.str. in Cyprus: "Experiences obtained by using an ultrasound detector on Cyprus, suggest that it is inhabited by both phonic types [of *P. pipistrellus* group] (J. Gaisler, pers. com.)." This report was based on a record made using a heterodyning bat detector by Professor Jiří Gaisler (Brno) in the surroundings of the monastery at Agia Napa on 6 September 2000 (J. Gaisler, in litt., 2001). However, after recent re-examination of his field notes, the author concluded that the data were insufficient to be able to recognise of the two species in question. Thus, only the records of numerous *P. kuhlii* registered by the detector at the monastery of Agia Napa can be considered relevant (J. Gaisler, in litt., 2007).

Fig. 20. Records of bats of the *Pipistrellus pipistrellus* group in Cyprus.

for details see Benda et al. 2003a, 2004a, Hulva et al. 2004) clustered with other Middle Eastern haplotypes of *P. pipistrellus*, showing only one mutation distance from the *P. pipistrellus* haplotype described from Syria (Benda et al. 2003a). Therefore, it is well reasonable to suppose a very recent colonisation of Cyprus by this lineage from the Levant. This could be also supported by low abundance of *P. pipistrellus* found on the island – compared to more frequent records of *P. pygmaeus*, see below.

Pipistrellus pygmaeus (Leach, 1825)

Records. **Original data**: S o u t h e r n C y p r u s: Agios Nikolaos, Diarizos river ca. 3 km to N, Kelefou bridge [2; Fig. 24], 16 April 2005: net. 1 ma, 4 fa (NMP 90419–90423 [S+A]); – Troodos, Kryos river ca. 2 km to SW [3], upper end of the Kalidonia Trail (Fig. 25), 5 September 2000: net. 2 m (MHNG 1807.090, 1807.091 [S+A]) (cf. Hanák et al. 2001, Stadelmann et al. 2004); 12 April 2005: 3 ma, 1 ms, 1 fs (NMP 90413–90417 [S+A]); – Troodos, Troodos Forest, small pools 3 km to NNW [4], 11 April 2005: net. 1 ma (NMP 90408 [S+A]).

Comments. The occurrence of *Pipistrellus pygmaeus* in Cyprus was already published by Hanák et al. (2001: 315), who mentioned preliminarily results of their genetic analysis: "A single sequence analysed from Cyprus confirms the presence of *P. pygmaeus* there (Ruedi, unpubl. data)." This sole sequence was used in the genetic analysis by Stadelmann et al. (2004), who first mentioned basic reference data on the corresponding specimen: "Mt. Troodos, 34° 91' N, 32° 75' E, (male, MNHG 1807.90)". Subsequently, the respective sequence and specimen were used in the analyses by Benda et al. (2004a) and Hulva et al. (2004). These reports refer to a male netted at the upper end of the Kalidonia Trail near Troodos on 5 September 2000.

Relatively numerous specimens of *P. pygmaeus* from Cyprus reported in the present paper come from forested and rather higher parts of the island (Fig. 20). All the collected bats were identified by the specific rapid PCR-based test described by Kaňuch et al. (2007). Although the records come from a broad altitudinal range (425–1770 m a. s. l.), the mean altitude of 1263 m indicates preference of mountainous parts of Cyprus. The small group of four adult females and one male caught at Kelefou bridge suggests presence of a colony, as the bats were netted in a short period after sunset above a small stream inside dense forest where hollow trees as possible shelters were likely to occur. The presence of *P. pygmaeus* in Cyprus represents the easternmost spot within the Mediterranean distribution range of the species which covers mainly continental Europe (Mayer & von Helversen 2001); connecting it with the only known records in northwestern Anatolia (Manyas Lake; Dietz et al. 2005) as well as in Greek Islands off the Anatolian shore (Lesvos and Rhodes; Hanák et al. 2001).

The Cypriot representatives of *P. pygmaeus* were found to differ markedly in some morphological characters from the examined European specimens. Although in the body size and external traits incl. the forearm length, the Cypriot samples conform to the European bats, they differ in the skull and tooth size and shape. Skulls of *P. pygmaeus* from Cyprus significantly oversize those of the European conspecifics, their size range rather resembles those of the examined *P. pipistrellus* samples (Fig. 21, Table 3). However, in the size of teeth and several tooth-rows the Cypriot samples of *P. pygmaeus* clearly oversize the examined European samples of *P. pygmaeus*, and in mean values also those of *P. pipistrellus* (Table 3, Figs. 22, 23). On the other hand, Cypriot samples of *P. pygmaeus* reach in tooth dimensions the values of the larger *P. hanaki* Hulva et

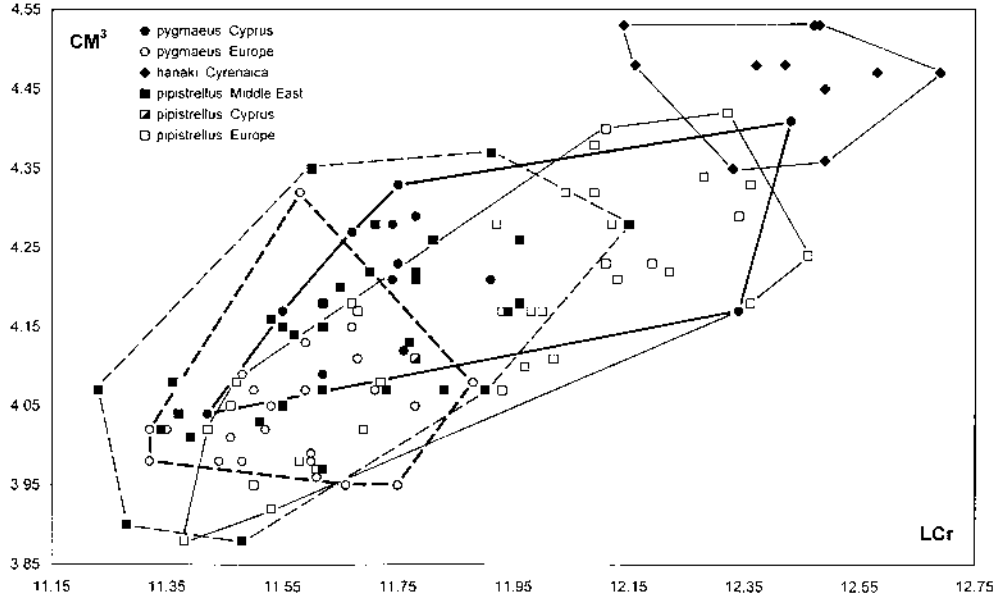
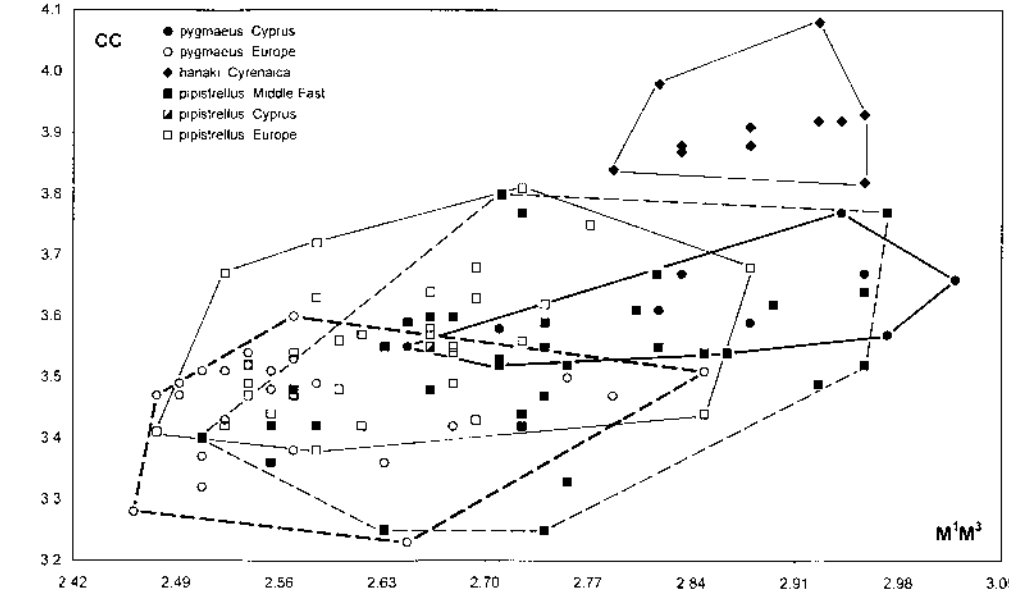
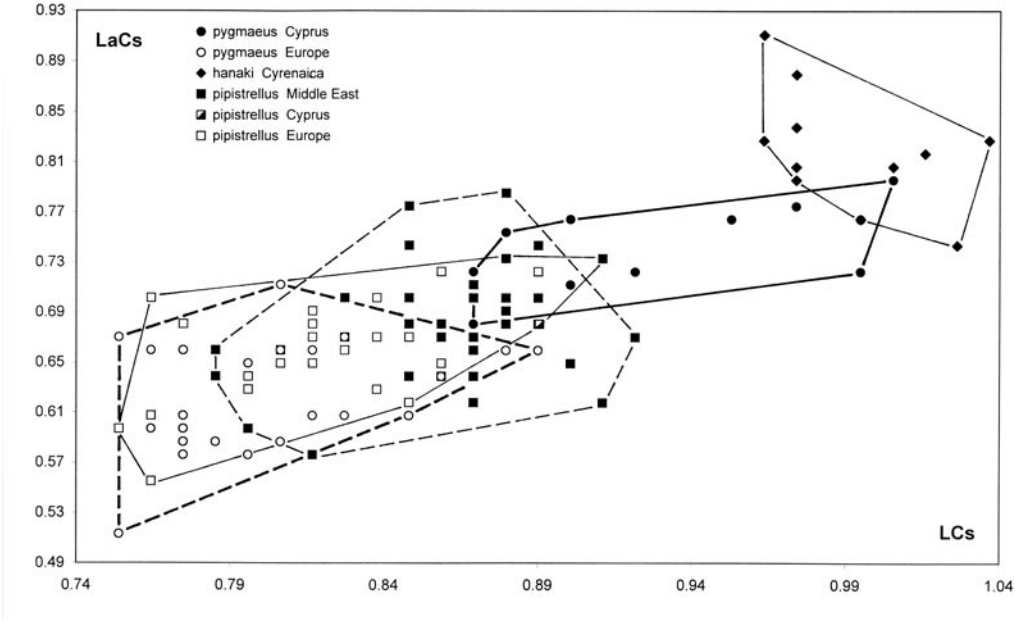


Fig. 21. Bivariate plot of the examined Cypriot and comparative samples of the *Pipistrellus pipistrellus* group: greatest length of the skull (LCr) against the length of the upper tooth-row (CM^3). The polygons denote clusters of the comparative samples as depicted in the legend.





Figs. 22, 23. Bivariate plots of the examined Cypriot and comparative samples of the *Pipistrellus pipistrellus* group. 22 (above) – length of the upper molar row (M^1M^3) against the rostral width across the upper canines (CC). 23 – (below) mesiodistal crown length of the upper canine (LCs) against the palatolabial width of the upper canine (LaCs).

Fig. 24. Kelefou bridge over the Diarizos river ca. 3 km north of Agios Nikolaos, the netting place of a possible colony of *Pipistrellus pygmaeus*; the calls of *Myotis nattereri* and *Eptesicus serotinus* were also recorded there (photo by Z. Bendová).

Benda, 2004, a sister species inhabiting Mediterranean parts of Cyrenaica, Libya (Benda et al. 2004a). In crown size of the upper canine, which was described to be significant for differentiation of *P. hanaki* from other species and populations of the group (Benda et al. 2004a), the Cypriot samples of *P. pygmaeus* constitute a dimensional transition between *P. hanaki* and other examined samples (Fig. 23). The Cypriot population of *P. pygmaeus* is thus the only known form of the *P. pipistrellus* group, which does not clearly differ in the skull and tooth traits from *P. hanaki* but partly overlaps it.

Two simple statistic tests clearly confirmed the significant differences existing between the Cypriot and European samples of *P. pygmaeus* in skull shape and size (Table 3). While the Cypriot samples are, on average, smaller in skull widths and heights (interorbital constriction, braincase dimensions), they are larger in longitudinal skull measures, mainly of tooth-rows. The most apparent difference between the two sets was proved in the crown size of upper canine. The distinction between these populations was also shown by a genetic analysis (Hulva et al. 2004); the examined individual of the Cypriot *P. pygmaeus* (MNHG 1807.090) exposed in a partial sequence of the mitochondrial gene for cytochrome *b* (402 bp, 5' end) the genetic distance of 3.0–3.7% from the haplotypes of *P. pygmaeus* from Europe (both western and central parts of Europe as well as the Balkans) and 6.7–7.0% from other closer relatives of the clade, the

Cyrenaican *P. hanaki* (Hulva et al. 2004). The distance between European and Cypriot populations of *P. pygmaeus* represents 12–15 mutation steps, suggesting isolation of these lineages for about 1 Ma (Hulva et al. 2004).

However, although the Cypriot and European samples of *P. pygmaeus* differ in size, morphology and genetic traits, their echolocation calls are very similar, with the maximum energy of around 55 kHz in both populations (in Cyprus tentatively recorded using a heterodyning detector only).

To be summarised, the Cypriot populations of *P. pygmaeus* represent a geographically, morphologically and also genetically clearly distinct unit within the species rank. Therefore, we regard the Cypriot population of *P. pygmaeus* to represent a separate subspecies:

***Pipistrellus pygmaeus cyprius* Benda, subsp. nov.**

Type material. **Holotype**: Adult male (NMP 90416 [S+A]) netted above the Kryos river near the upper end of the Kalidonia Trail, ca. 2 km to SW of Troodos, 12 April 2005, leg. P. Benda, V. Hanák & I. Horáček. **Paratypes** (6): site as in the holotype, two adult males (MHNG 1807.090, 1807.091 [S+A]), 5 September 2000, leg. M. Ruedi, two adult males, one subadult male and one subadult female (NMP 90413–90415, 90417 [S+A]), 12 April 2005, leg. P. Benda, V. Hanák & I. Horáček.

Comparative material. See the Appendix 1 by Benda et al. (2004a) and Appendix II by Benda et al. (2006).

Fig. 25. Kryos river ca. 2 km southwest of Troodos, ca. 100 m from the upper end of the Kalidonia Trail; the type locality of *Pipistrellus pygmaeus cyprius* subsp. nov. and the netting site of *Eptesicus serotinus*, *Hypsugo savii*, *Pipistrellus pipistrellus*, *Nyctalus leisleri*, and *Plecotus kolombatovici*. It is a site of the first record of three bat species in Cyprus (photo by Z. Bendová).

Table 3. Basic biometric data on the examined Cypriot and comparative samples of the Mediterranean populations of the *Pipistrellus pipistrellus* group and results of statistic tests comparing the European and Cypriot samples of *P. pygmaeus*. For abbreviations see p. 75; for the comparative material origin see Benda et al. (2004a, 2006)

	P. pygmaeus cyprius ssp. n. Cyprus					*P. pygmaeus pygmaeus* Europe					ANOVA		t-test	
	n	**M**	min	max	SD	n	**M**	min	max	SD	F	p	t	p
LAt	13	**29.99**	28.5	31.3	0.870	27	**30.44**	28.6	31.8	0.744	2.86		-1.69	
LCr	13	**11.80**	11.42	12.43	0.284	25	**11.59**	11.32	11.88	0.156	8.76	**	2.96	**
LCb	13	**11.36**	10.90	11.85	0.263	25	**11.10**	10.78	11.34	0.154	14.38	***	3.79	**
LaZ	11	**7.48**	7.27	7.82	0.170	17	**7.39**	7.18	7.65	0.139	2.56		1.60	
LaI	13	**3.02**	2.88	3.18	0.089	25	**3.26**	3.00	3.47	0.109	47.68	***	–6.91	**
LaN	13	**6.07**	5.81	6.26	0.137	25	**6.13**	5.92	6.28	0.107	2.90		–1.70	
ANc	13	**4.21**	3.96	4.33	0.094	25	**4.32**	4.07	4.58	0.132	7.84	**	–2.80	**
CC	13	**3.62**	3.52	3.83	0.093	25	**3.45**	3.23	3.60	0.087	32.32	***	5.68	***
M^3M^3	13	**4.92**	4.73	5.12	0.115	25	**4.77**	4.62	4.98	0.097	17.94	***	4.24	***
CM^3	13	**4.22**	4.04	4.41	0.102	25	**4.05**	3.95	4.32	0.082	28.41	***	5.33	***
M^1M^3	12	**2.85**	2.65	3.02	0.116	24	**2.58**	2.46	2.85	0.100	51.96	***	7.21	***
CP^4	13	**1.89**	1.77	2.07	0.096	25	**1.75**	1.63	1.95	0.075	22.37	***	4.73	***
LCs	13	**0.93**	0.87	1.01	0.051	25	**0.81**	0.75	0.89	0.039	67.28	***	8.20	***
LaCs	13	**0.74**	0.68	0.80	0.031	25	**0.63**	0.51	0.71	0.045	65.79	***	8.11	***
LMd	13	**8.30**	8.07	8.87	0.227	25	**8.02**	7.83	8.28	0.123	25.66	***	5.07	***
ACo	13	**2.47**	2.34	2.61	0.092	25	**2.30**	2.12	2.51	0.078	34.75	***	5.89	***
CM_3	12	**4.45**	4.28	4.75	0.129	24	**4.27**	4.08	4.41	0.075	29.77	***	5.46	***
M_1M_3	12	**3.09**	2.86	3.31	0.132	24	**2.78**	2.65	3.10	0.115	51.51	***	7.18	***
CP_4	13	**1.53**	1.43	1.65	0.071	24	**1.41**	1.33	1.53	0.058	26.42	***	5.14	***

	P. hanaki Cyrenaica					*P. pipistrellus* Europe					*P. pipistrellus* Middle East				
	n	**M**	min	max	SD	n	M	min	max	SD	n	M	min	max	SD
LAt	13	**32.38**	31.2	33.4	0.732	36	**31.33**	29.4	33.2	1.033	39	**30.51**	28.9	33.9	0.945
LCr	12	**12.43**	12.14	12.69	0.161	34	**11.93**	11.38	12.46	0.314	37	**11.60**	10.93	12.15	0.268
LCb	12	**11.95**	11.64	12.18	0.151	34	**11.41**	10.88	11.92	0.284	37	**11.16**	10.42	11.62	0.289
LaZ	12	**7.88**	7.74	8.12	0.126	25	**7.49**	7.25	7.78	0.124	29	**7.38**	6.72	7.68	0.214
LaI	12	**3.15**	2.98	3.35	0.116	34	**3.30**	3.07	3.48	0.109	37	**3.18**	2.87	3.39	0.124
LaN	12	**6.32**	6.12	6.51	0.100	34	**6.27**	5.86	6.61	0.190	37	**6.06**	5.62	6.37	0.157
ANc	12	**4.45**	4.36	4.63	0.072	34	**4.34**	4.08	4.55	0.108	37	**4.21**	4.02	4.37	0.091
CC	12	**3.91**	3.82	4.08	0.069	34	**3.56**	3.38	3.81	0.108	36	**3.52**	3.25	3.80	0.131
M^3M^3	12	**5.14**	4.98	5.31	0.091	34	**4.87**	4.65	5.11	0.126	37	**4.83**	4.32	5.17	0.153
CM^3	12	**4.46**	4.35	4.53	0.060	34	**4.17**	3.88	4.42	0.143	36	**4.11**	3.78	4.37	0.131
M^1M^3	12	**2.88**	2.79	2.96	0.058	32	**2.64**	2.48	2.88	0.094	36	**2.73**	2.41	2.97	0.129
CP^4	12	**1.86**	1.76	1.94	0.047	33	**1.78**	1.64	1.99	0.070	35	**1.81**	1.63	2.04	0.083
LCs	12	**0.99**	0.95	1.04	0.027	33	**0.83**	0.75	0.91	0.041	31	**0.86**	0.79	0.92	0.035
LaCs	12	**0.82**	0.74	0.91	0.045	33	**0.66**	0.55	0.73	0.041	31	**0.68**	0.58	0.79	0.048
LMd	11	**8.72**	8.62	8.82	0.064	34	**8.24**	7.73	8.62	0.233	36	**8.09**	7.59	8.58	0.224
ACo	11	**2.57**	2.47	2.76	0.082	34	**2.34**	2.09	2.52	0.104	36	**2.31**	1.97	2.67	0.143
CM_3	11	**4.73**	4.62	4.83	0.072	33	**4.41**	3.98	4.62	0.139	34	**4.36**	4.14	4.62	0.132
M_1M_3	11	**3.09**	2.99	3.16	0.055	33	**2.86**	2.72	3.11	0.091	34	**2.93**	2.66	3.19	0.129
CP_4	11	**1.60**	1.56	1.64	0.026	34	**1.44**	1.18	1.61	0.086	33	**1.47**	1.37	1.56	0.059

Type locality. Republic of Cyprus, Troodos Mts; at the Kryos river near the upper end of the Kalidonia Trail, ca. 2 km to SW of Troodos (crossroads of mountainous roads), district of Lemesos, 34° 55' N, 32° 52' E, ca. 1595 m a. s. l. (Fig. 25)

Description and diagnosis. *Pipistrellus pygmaeus cyprius* subsp. nov. is a small bat belonging to the *Pipistrellus pipistrellus* complex, in most its morphological and genetic characters conforming to the nominotypical subspecies of *P. pygmaeus* from continental Europe. *P. p. cyprius* subsp. nov. differs from *P. p. pygmaeus* by having a longer but relatively narrower and lower skull and more massive teeth, ranges of skull and tooth sizes only marginally overlap in the two subspecies (see Table 3). Within the species, the skull of *P. p. cyprius* subsp. nov. is on average large (LCr 11.4–12.4 mm) but narrow (LaI 2.9–3.2 mm, LaN 5.8–6.3 mm) and low (ANc 3.9–4.3 mm), in size range similar to *P. pipistrellus* and reaching *P. hanaki*. The rostral part of the skull is on average rather long and wide (CM^3/LCr 0.40–0.43; CC/LCr 0.30–0.32). Tooth-rows are long (CM^3 4.0–4.4 mm; CM_3 4.3–4.8 mm; CP^4 1.8–2.1 mm; CP_4 1.4–1.7 mm), significantly longer than in *P. p. pygmaeus* and similar to *P. pipistrellus* and/or to *P. hanaki*. Crowns of the upper canines are mesiodistally absolutely and relatively long and palatolabially rather broad (LCs 0.87–1.01 mm; LaCs 0.68–0.80 mm); the upper canines are in their mesiodistal lengths as long as in *P. hanaki*, but palatolabially narrower than in the latter species (LCs/LaCs 1.17–1.38; mean 1.25). Unicuspidal tooth-rows are long, on average longer than in *P. p. pygmaeus*, in absolute values in some cases even longer than in *P. hanaki* (CP^4 1.8–2.1 mm; CP_4 1.4–1.7 mm); mesiodistal length of the second upper premolar (P^4) crown is on average the largest within the *P. pipistrellus* species complex (1.01–1.29 mm; mean 1.15). Molars are very large, M^1 is extremely wide (M^1 mesiodistal length 1.01–1.24 mm, mean 1.15; palatolabial width 1.28–1.48 mm, mean 1.38); molar-rows are on average similarly long as in *P. hanaki*, absolute values of some cases being even larger (M^1M^3 2.7–3.0 mm; M_1M_3 2.9–3.3 mm), and also significantly larger than in *P. p. pygmaeus* and on average also than in *P. pipistrellus*. For other dimensional points of the differential diagnosis see Table 3 and Figs. 21–23, for dimensions of the examined specimens of *P. p. cyprius* subsp. nov., including the type series, see Appendix III.

The glans penis in *P. p. cyprius* subsp. nov. has a medial stripe on dorsal side of praeputium covered by greyish-brown hairs (Fig. 26), creating in its shape a transition between the type present in *P. pipistrellus* and in *P. p. pygmaeus* (plus *P. hanaki*) as described by Häussler et al. (2000). In

Fig. 26. Penis of *Pipistrellus pygmaeus cyprius* subsp. nov. (photo by I. Horáček).

all examined specimens of *P. p. cyprius* subsp. nov., the venation of wing was of the *P. pipistrellus* type (von Helversen & Holderied 2003: 424, Abb. 4 B). Echolocation calls of *P. p. cyprius* subsp. nov. have a maximum energy of the terminal frequency at about 55 kHz. According to the present knowledge, *P. p. cyprius* subsp. nov. seems to be geographically limited to Cyprus.

Complete sequence of the mitochondrial gene for cytochome *b* of a paratype (MNHG 1807.090; 1140 bp, NCBI Accession Number AJ504442; after Stadelmann et al. 2004): atg aca aac att cga aag tcc cat ccc cta atc aaa att att aac agc tca ttc att gac cta ccg act ccg tca aac att tca gca tga tgg aat ttt gga tcc tta tta ggc atc tgt cta ggg ctg caa atc cta aca ggc cta ttt ctt gct ata cac tac acg tca gac aca gca aca gcc ttc agc tct gtc acc cac atc tgc cga gac gta aat tat gga tga gtc cta cga tat cta cac gca aac gga gcc tca atg ttt ttt att tgc ata tat cta cac gta ggg cga ggt ctt tac tat ggg tcc tac tta ttt aaa gaa acc tga aat ata gga gtt att tta cta ttc gct gta ata gca acg gcc ttc ata ggc tat gta tta cca tga ggc caa ata tcc ttt tga ggg gcc acc gtc att act aac cta ctc tcc gca atc cca tat att ggg acc aac ctt gtt gaa tga att tga gga gga ttt tct gta gac aaa gcc acc tta acc cga ttc ttc gcc ttc cat ttt ctt ctc ccc ttt att att tca gct tta gtc atg gtt cac ctc tta ttt tta cat gaa aca ggg tct aat aac cca aca ggc atc ccc tct aac ata gat ata att ccc ttc cac cca tac tac aca atc aaa gac att ctg gga ctc ttt ata ata att ctt gcc cta ttg tct tta gtc cta ttt tca cct gat ata tta ggc gac ccc gat aac tac aca cca gca aat cca cta agc act ccc ccc cac att aaa cca gaa tga tac ttc tta tts gca tac gca atc cta cga tca att cct aat aag cta gga gga gtc cta gcc tta gtc ctt tcc atc ctc atc ctt gta att atc ccc ttc ctc cac aca tcc aaa caa cga agc atg act ttc cgc cct ctc agt caa tgt tta ttc tga ctt tta gca gca gac ctt tta acc ttg aca tga atc gga gga caa cca gtt gaa cac cct tat gtt atc atc ggc caa tta gcc tct att cta tat ttt tta atc atc att gta atc ata cct ctg aca agc ctc ata gaa aat cac cta tta aaa tga aga.

According to Table 2 by Benda et al. (2004a: 205), partial sequence of the mitochondrial gene for cytochrome *b* (402 bp, 5' end, haplotype CYP1) of the examined Cypriot specimen of *P. p. cyprius* subsp. nov. has unique mutations within the *P. pygmaeus* haplotype group at six positions (66: A→G; 67: G→A; 72: A→G; 216: T→C; 267: A→G; 280: C→A), at one position it shares the same unique mutation with *P. hanaki* (106: C→T), and at two positions with *P. hanaki* and *P. pipistrellus* (81: C→T; 276: C→T).

Derivatio nominis. The name *cyprius* refers to the island of Cyprus, the only known area of distribution of *P. p. cyprius* subsp. nov.

Pipistrellus kuhlii (Kuhl, 1817)

Records. **Original data**: S o u t h e r n C y p r u s: Agia Napa [1], Karystos resort and the area westwards, 3 and 4 September 2000: det. 1–2 inds. (leg. J. Gaisler); – Agia Napa [2], monastery area and surroundings, 6 September 2000: det. numerous inds. (leg. J. Gaisler); – Apliç, ca. 4 km to S [3], inflow of the Setrachos river into a dam, 15 April 2005: det. min. 3 inds.; – Apsiou [4], irrigation reservoir, 30 March 2005: det. min. 1 ind.; – Kalavasos, around an entrance of an abandoned mine ca. 3 km to NW [5; Fig. 11], 28 July 2006: det. min. 5 inds.; – Kalavasos, Vasilikos river [6], 14 April 2005: net. 1 ma, det. min. 10 inds. (a colony); – Lemesos, touristic resort ca. 4 km to E [7], 27 March 2005: repeatedly det. min. 1 ind.; – Neo Horio, Petratis gorge ca. 4 km to E [8], 25 March 2005: det. min. 1 ind.; – Neo Horio, Smigies Trail ca. 3 km to NW [9], at the abandoned chromite mine system 'Magnesia Mine', 9 April 2005: det. 1 ind.; – Pano Lefkara, road bridge ca. 3 km to NW [10], below the Lefkara Dam, 12 April 2005: det. and obs. min. 10 inds.; 24 July 2006: det. min. 2+ inds.; – Paramytha [11], at a small cave above a road (Fig. 40), 31 March 2005: det. a colony; – Perivolia [12], 25 October 1990: 1 ma flew into a hotel room (NMP 90832 [S+B]; leg. J. Sklenář); – Prodromi, Androlikou gorge ca. 2 km to SW [13], 26 March 2005: det. 1 ind.; – Protaras [14], cave in a cliff above the village, 18 October 2005: net. 1 ms; – Troodos, Troodos Forest ca. 3 km to W [15], Hadjipavlou mine (Fig. 16), 14 October 2005: det. 1 ind.; – Vretsia, Xeros river ca. 2 km to E [16; Fig. 31], 500 m to S of the Roudias bridge, 22 July 2006: det. 1 ind. – N o r t h e r n C y p r u s: Afendrika [17], ruins of the Panagia Chrysiotissa church and the Asomatos church, 17 October 2005: net. 7 ma, 1 ms, 5 fa, 2 fs (coll. 7 m, 4 f, NMP 91238–91245 [S+A], 91236, 91237, 91246 [A]); ruins of the Panagia Chrysiotissa church (Fig. 27), 25 July 2006: obs. dispersed colony of min. 8 inds. in vault fissures, coll. 1 ma, 1 fa (NMP 90920, 90921 [S+A]); – Ayios Filon [18], basilica ruins (Fig. 28), 25 July 2006: 4 inds. in a vault fissure; – Beylerbeyi [19], Bellapais Abbey ruins, 27 July 2006: 8 inds. in vault fissures; – Kaleburnu [20], village, 18 April 2005: det. min. 2+ inds.; – Kantara, Kantara castle ruins

Figs. 27, 28. Roosts of colonies of *Pipistrellus kuhlii* (Kuhl, 1817) in northeastern Cyprus; both sites are relatively exposed to daylight (both photos by Z. Bendová). 27 (left) – ruins of the Panagia Chrysiotissa church at Afendrika; a dispersed colony was found in ceiling fissures throughout the southern side of the vault (at the right side of the picture). 28 (right) – ruined basilica of Ayios Filon; at least four individuals were observed in a fissure in the highest point of the ceiling vault above the head of the person.

3 km to NE [21; Fig. 18], 25 July 2006: det. min. 1 ind. – **Published data**: S o u t h e r n C y p r u s: Ayia Napa [= Agia Napa] [2], east of the town and at the harbour, March 1987: sightings (Boye et al. 1990); – Bath of Aphrodite [= Loutra tis Afroditis] [22], 1989 (Boye et al. 1990); – Larnaka [23], 1896, 1 ind. (MNS 2209; leg. Dr. Hesse) (Kock 1974); – Limassol [24] (Bequaert 1953, Theodor 1956); – Nicosia [= Lefkosia] [25] (Jordan 1942, Hopkins & Rothschild 1956); – Paphos [= Pafos] [26], January 1987, March and December 1989: sightings (Boye et al. 1990); – Trimithousa [= Tremithousa] [27] (Paphos), April 1988: sightings (Boye et al. 1990). – N o r t h e r n C y p r u s: near Akanthou, northern shore [28], 1 ind. (mummy) (Spitzenberger 1979); – Bellapais [19], monastery ruins, 9 August 1988: 1 ind. (Opstaele 1990); – Boghaz [= Bogazi] [29] (Famagusta), April 1990: sightings (Boye et al. 1990); – Famagusta, old town [30], columnes of Venice Palace, March 1989: colony (Boye et al. 1990); – Famagusta, old town [31], wall crevices and behind a board of a house near the old land gate, March 1989: colony (Boye et al. 1990); – Kyrenia [32], harbour, March 1989: sightings (Boye et al. 1990). – C y p r u s: Cyprus, 2 ind. [Lord Lilford coll.] (Günther 1879); – Cyprus, "commonest of the small bats; in June 1901 several were brought to me", incl. 1 faG (Bate 1903); – Cyprus (Theodor 1954, 1967, Theodor & Moscona 1954); – Zypern [= Cyprus], without data, 1 ind. (Spitzenberger 1979).

Comments. *Pipistrellus kuhlii* is the second most often recorded bat species in Cyprus (after *R. aegyptiacus*, see above and Table 1); it also represents one of the oldest known bats occurring in the island, for the first time mentioned already by Günther (1879). At least 32 detailed record sites are known from Cyprus (Fig. 29), plus four not appropriately localised ones. Such abundance of *P. kuhlii* records well corresponds with the state of its occurrence known in the Levantine mainland (see the review by Benda et al. 2006). The records come mostly from lowland locations, although

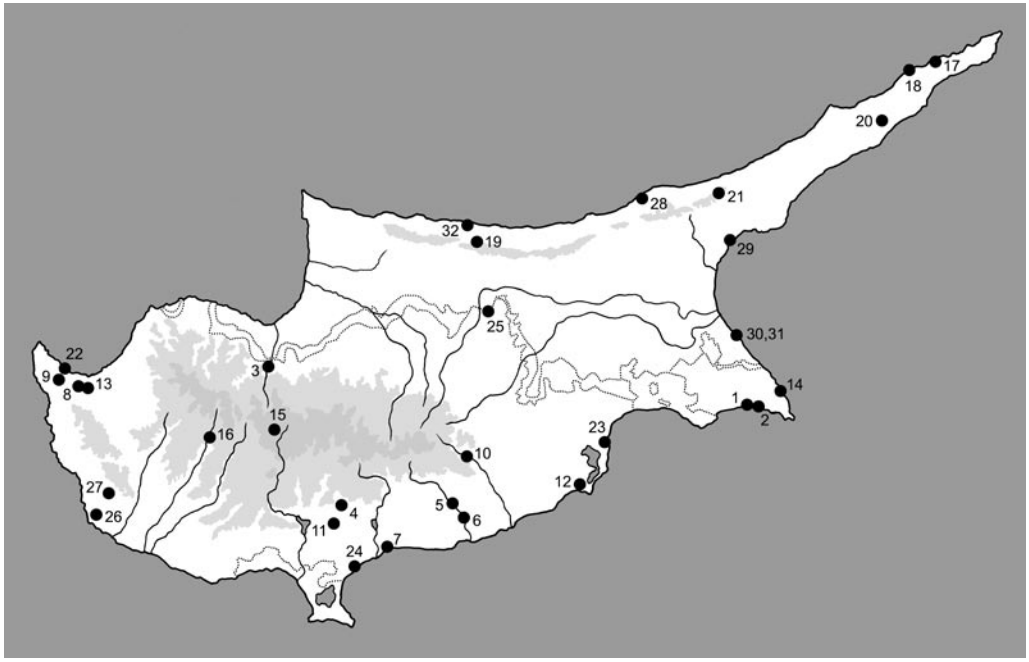


Fig. 29. Records of *Pipistrellus kuhlii* (Kuhl, 1817) in Cyprus.

from a wide altitude range of 0–1630 m a. s. l. (mean 148 m). Similarly as *R. aegyptiacus*, *P. kuhlii* seems to use the higher forested sites occasionally and to dwell more agricultural and rather dry lowland parts of the island. External and cranial dimensions of the examined Cypriot specimens of *P. kuhlii* are shown in Appendix III.

Nyctalus noctula (Schreber, 1774)

Records. **Original data**: S o u t h e r n C y p r u s: Troodos, Troodos Forest ca. 1.5 km to N, around an abandoned chromite mine, 13 October 2005: det. 1 ind. of cf. *N. noctula*. – **Published data**: S o u t h e r n C y p r u s: Aphrodite's bath [= Loutra tis Afroditis], March 1988: calls of a Noctule bat, cf. *N. noctula*. – C y p r u s: Zypern [= Cyprus], 3 inds. (Spitzenberger 1979).

Comments. Spitzenberger (1979) mentioned three stuffed specimens of *Nyctalus noctula* from Cyprus, which she found in an exhibition of the "Municipal Natural History Museum in Limassol"; she noted them to be small and relatively dark. Boye et al. (1990) recorded a call of a noctule bat, however, they only tentatively assigned it to *N. noctula*. Similarly, our record of a call from the Troodos Mts, though it corresponded exactly to that of *N. noctula* of Europe (in the heterodyne mode at ca. 15–18 kHz) could be only tentatively affiliated to this species, because it was related to a single individual passing through. Moreover, the record might have been misidentified since the individual could also pertain to *N. lasiopterus* (see below), known to produce quite similar echolocation calls. When observed in flight individually, an unambiguous species determination

is impossible without simultaneous comparison with an individual of the other species (together with the use of a bat detector), enabling to assess the size difference properly.

As the records of *N. noctula* have been reported in the Mediterranean parts of all Levantine countries from Turkish Cilicia to the West Bank (Festa 1894, Lewis & Harrison 1962, Osborn 1963, Harrison & Makin 1988, Mendelssohn & Yom-Tov 1999, Benda et al. 2006) and other species of the genus *Nyctalus* Bowdich, 1825 had not been previously known to occur in the eastern Mediterranean (see e.g. Kumerloeve 1975a, b), the interpretations of the records by Spitzenberger (1979) and Boye et al. (1990) seem to be fully understandable. However, *N. noctula* currently remains the only *Nyctalus* species which has been recorded in Cyprus only indirectly, as the call records were not completely convincing and the specimens were found in the public display where their origin can be only guessed. Exhibits of *N. noctula* of an unreliable origin, formerly sold by natural history traders, can cause confusion when assessing the composition of local fauna, see e.g. Kowalski & Rzebik-Kowalska (1991) who described such case concerning the uncertain *N. noctula* records in Algeria and North Africa as well (see also Rasmussen & Prŷs-Jones 2003 for a detailed review of some possible fates of collection specimens and their reliability).

On the other hand (when the Cypriot origin of the respective bats is accepted), as Spitzenberger (1979) did not give any measurements of the reported exhibits to support their identification, one can suppose her mentioned "wenig ansprechend gearbeiteten" specimens to assign to *N. leisleri* rather than to *N. noctula*. The former species is a smaller and darker representative of the genus and is certainly present in the island (see below). During our three visits of the 'Natural History Museum of Lemesos', a small exhibition in two rooms within the Municipal Zoological Garden of Lemesos (Horáček: April 2005; Benda & Hanák: April 2005; Benda: July 2006), no *Nyctalus* specimen was present in the exhibition and available for a revision (from bats only one stuffed specimen of *Pipistrellus kuhlii* was observed).

Although the occurrence of *N. noctula* in Cyprus is well possible, taking into account its known Levantine range, we regard the records of this species in Cyprus rather tentative and its presence there in a need to be proved by a finding of an animal.

Nyctalus leisleri (Kuhl, 1817)

Records. **Original data**: S o u t h e r n C y p r u s: Troodos, Kryos river ca. 2 km to SW [1], upper end of the Kalidonia Trail (Fig. 25), 13 April 2005: net. 1 ma, 1 fa (NMP 90411, 90412 [S+A]); 22 July 2006: net. 2 ma (NMP 90901, 90902 [S+A]); – Troodos, Troodos Forest ca. 1.5 km to N [2], around abandoned chromite mine, 13 October 2005: obs. & det. 1–2 inds.

Comments. *Nyctalus leisleri* is here reported from Cyprus for the first time. This bat was repeatedly netted at one site in a higher and densely forested part of the Troodos Mts (at 1595 m a. s. l.) in spring and summer; in addition, its calls were recorded in autumn at a close site (at 1505 m a. s. l.) (Fig. 30). Such temporal distribution of records could indicate permanent occurrence of this migratory species in the island's forests.

This finding represents the easternmost spot of the species occurrence in the Mediterranean *s. str.*, the other nearest records are known from southwestern Anatolia (Köprü Irmağı gorge, N of Beşkonak; von Helversen 1989) as well as in Dodecannese Islands of Greece (Afandou, Rhodes; Hanák et al. 2001). Although the distribution range of *N. leisleri* continues from the Balkans via the forested Pontic Mts to the Caucasus and North Persian regions (DeBlase 1980, Benda & Horáček 1998, Albayrak 2003, our unpubl. records), this bat has never been found in the Levant (Benda et al. 2006). External and cranial dimensions of the Cypriot specimens of *N. leisleri* are shown in Appendix III.

Fig. 30. Records of *Nyctalus leisleri* (Kuhl, 1817) (closed symbols) and *Nyctalus lasiopterus* (Schreber, 1780) (open symbol) in Cyprus.

Nyctalus lasiopterus (Schreber, 1780)

Records. **Original data**: S o u t h e r n C y p r u s: Vretsia, Xeros river ca. 2 km to E [1], 500 m to S of the Roudias bridge, 22 July 2006: net. 1 ms, 4 fa, 3 fs (coll. 1 m, 5 f; NMP 90913–90916, 90918 [S+A], 90917 [A]).

Comments. *Nyctalus lasiopterus* is here reported from Cyprus for the first time. Similarly as in the previous species, its finding in Cyprus represents the easternmost spot of occurrence in the Mediterranean *s. str.* (Fig. 30). Despite the relative scarcity of its records throughout the range, the general pattern of distribution in the eastern Mediterranean is almost identical as in *N. leisleri*. Also in *N. lasiopterus*, the Cypriot record continues the only record in southwestern Turkey (Elmalı, Antalya Dist.; Yiğit et al. in press), while in northern Anatolia only two findings have been reported (Mustafa Kemal Paşa Dist., Kahmann & Çağlar 1959, Kahmann 1962; Exploration Platform in the Black Sea 43 km off the Turkish shore near Fındıklı, Karataş et al. 2007). However, similarly as in *N. leisleri*, *N. lasiopterus* inhabits the Balkans, Caucasus region and northern Iran as well as Cyrenaica, Libya (Ibáñez et al. 2004), but it has never been recorded in the Levant proper (Benda et al. 2006).

The finding in Cyprus is represented by netting of eight individuals in a riparian plane grove of the Xeros river valley (325 m a. s. l., Fig. 31) in the area neighbouring the forests of the Troodos Mts. The catch was comprised of four adult females (two of them were still in the lactation phase) and four full-grown juveniles suggesting presence of a nursery colony (as the netting was performed in the second half of July, when nursery colonies are expected to be still persisting,

see Ibáñez et al. 2004) and thus, reproduction on the island. External and cranial dimensions of the Cypriot specimens of *N. lasiopterus* are shown in Appendix III.

Plecotus kolombatovici Đulić, 1980

Records. **Original data**: S o u t h e r n C y p r u s: Kakopetria, Troodos Forest, abandoned mine 5 km to SW [1], upper gallery (Fig. 10), 13 October 2005: net. 1 fs (NMP 91209 [S+A]); 14 October 2005: net. 1 fa (NMP 91228 [S+A]; Fig. 36); – Neo Horio, Smigies Trail ca. 3 km to NW [2], abandoned chromite mine system 'Magnesia Mine', 9 April 2005: net. 1 ma (NMP 90398 [S+A]); – Troodos, Kryos river ca. 2 km SW [3], upper end of the Kalidonia Trail (Fig. 25), 22 July 2006: net. 2 ma, 1 ms, 11 faL, 1 fs (coll. 3 m, 7 f; NMP 90903–90908, 90910, 90911 [S+A], 90909, 90912 [A]); – Troodos, Troodos Forest ca. 3 km to W [4], Hadjipavlou mine (Fig. 16), 14 October 2005: net. 1 ma, 1 fa (NMP 91224 [S+A], 91223 [A]), det. 2 inds. – N o r t h e r n C y p r u s: Agırdağ [5], cleft cave, 5 April 2005: net. 1 fa (NMP 91268 [S+A]; Fig. 35). – C y p r u s: Cyprus (undef.), 1 ind. (J. Reinhold, in litt). – **Published data**: S o u t h e r n C y p r u s: Akamas [cf. 2], cave, 5 May 1990: 1 m (Boye et al. 1990; as *P. austriacus*); – Troodos Mts [cf. 1, 3, 4], two caves, 19 June 1988: 4 inds., another cave, December 1989: 1 ind. (Boye et al. 1990; as *Plecotus* sp.).

Comments. Boye et al. (1990) were the first to report findings of bats of the genus *Plecotus* Gray, 1818 in Cyprus; they mentioned two forms to be found in the island, the 'typical' *P. austriacus* (Fischer, 1829) and a mountain population of *Plecotus* sp., without species identification. While

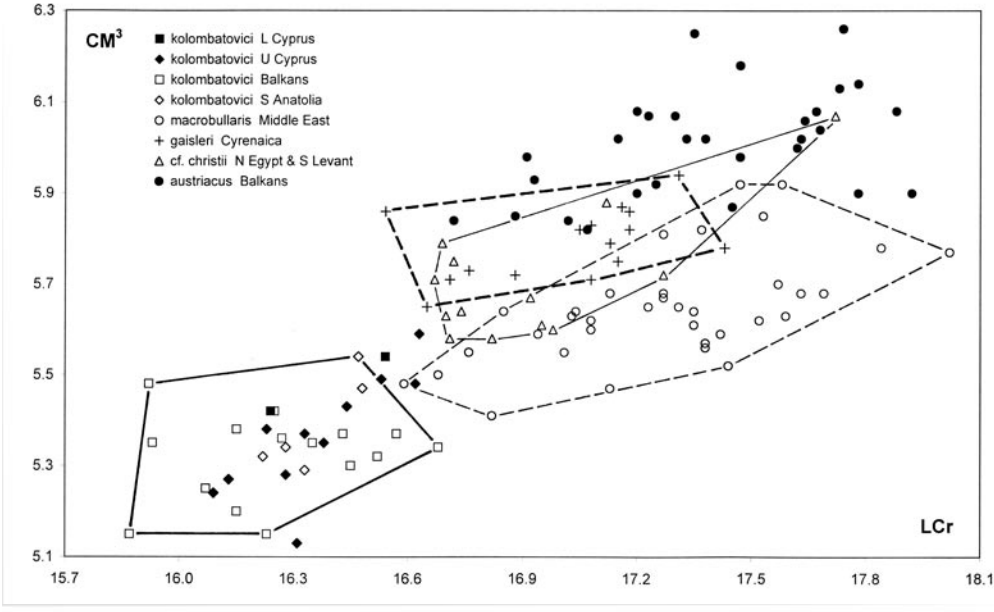
Fig. 31. Xeros river ca. 2 km east of Vretsia and ca. 500 m south of the Roudias bridge, the site where eight individuals of *Nyctalus lasiopterus* (Schreber, 1780) were netted (photo by Z. Bendová).

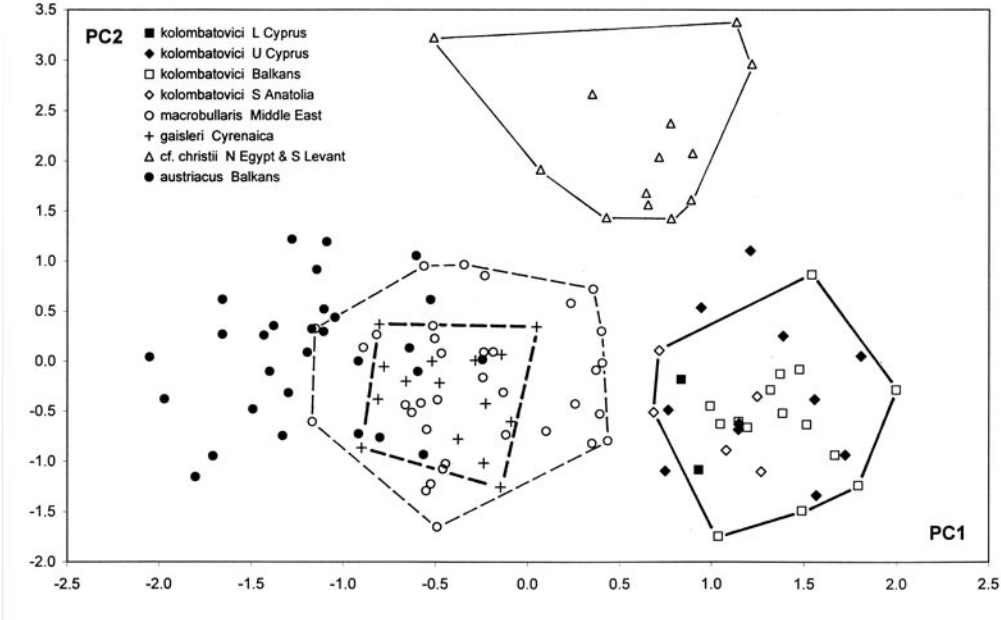
Fig. 32. Records of *Plecotus kolombatovici* Đulić, 1980 in Cyprus.

the name of the European bat *P. austriacus* used by Boye et al. (1990) could well correspond to *P. kolombatovici* in its contemporary sense*, as the latter form was formerly regarded a subspecies of *P. austriacus* in southeastern Europe (Đulić 1980, Horáček et al. 2000, Kiefer & von Helversen 2004, Spitzenberger et al. 2001, 2006, etc.), the other form referred to *Plecotus* sp. suggested existence of an undescribed long-eared bat species, endemic for higher altitudes of the Troodos Mts (see the comments by Boye et al. 1990).

We recorded relatively numerous individuals of *Plecotus kolombatovici* at five sites throughout the island, including the Akamas peninsula and also in higher situated localities of the Troodos Mts (the altitude range being ca. 300–1665 m a. s. l., mean 1080 m; Fig. 32), i.e., in the same areas from which Boye et al. (1990) reported their two *Plecotus* forms. All examined Cypriot specimens created a homogenous group with relatively short forearms and thumbs (Table 4); the small thumb lengths indicated the *P. austriacus* species group (according to Spitzenberger et al. 2006) and excluded that the bats might belong to the species of the *P. auritus* group present in the Mediterranean, i.e. *P. auritus* (Linnaeus, 1758) or *P. macrobullaris* Kuzjakin, 1965. From the former group, four forms are present in the eastern Mediterranean, viz. *P. austriacus* (with the easternmost known occurrence in the Balkans), *P. kolombatovici* (Balkans and southern Anatolia), *P.* cf. *christii* Gray, 1838 (southern parts of Jordan and Israel and northern Egypt incl. Sinai;

* Note. Although the systematic relations within the *P. teneriffae/kolombatovici* clade are rather unresolved (see the review by Benda et al. 2006), here we tentatively follow the taxonomic arrangement suggested by Mayer et al. (2007). They regard the populations of the clade from southeastern Europe and the Middle East to belong to *P. kolombatovici*, a species genetically separated from the North African *P. gaisleri* Benda, Kiefer, Hanák et Veith, 2004 and the Canarian *P. teneriffae* Barrett-Hamilton, 1907.





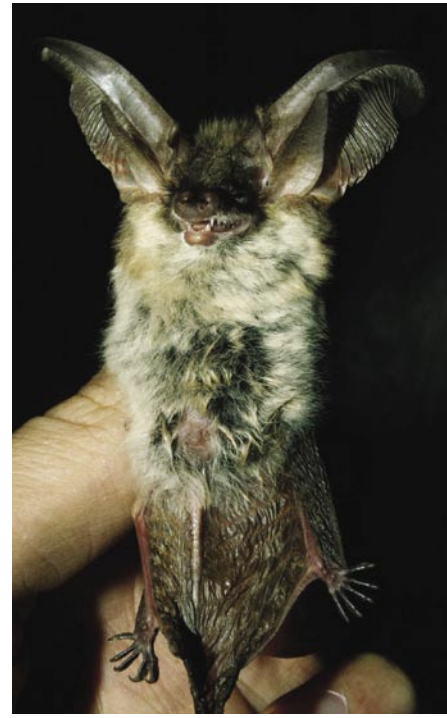
Figs. 33, 34. Bivariate plot of the examined Cypriot and comparative samples of the genus *Plecotus* Geoffroy, 1818; the polygons denote clusters of the comparative samples as depicted in the legend; L Cyprus = lower or lowland Cyprus, U Cyprus = upper or mountain Cyprus. For the origin of the comparative material see Benda & Ivanova (2003) and Benda et al. (2004b, 2006). 33 (above) – greatest length of the skull (LCr) against the length of the upper tooth-row (CM^3). 34 (below) – results of the principal component analysis (PC1=51.64% of variance; PC2=15.15%) of 13 cranial dimensions (see Table 4).

Table 4. Basic biometric data on the examined Cypriot samples of *Plecotus kolombatovici* Đulić, 1980 and comparative samples of Mediterranean populations of the genus *Plecotus* Geoffroy, 1818. For abbreviations see p. 75; for the comparative material origin see Benda & Ivanova (2003) and Benda et al. (2004b, 2006); * – data taken from Benda et al. (2004b), ** – cranial data taken from Benda et al. (2006)

	P. kolombatovici Cyprus					*P. kolombatovici** Balkans & S Anatolia					*P. macrobullaris* Middle East				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	16	**38.37**	36.5	40.7	1.012	21	**37.64**	36.1	39.0	0.859	37	**42.63**	39.8	45.7	1.487
LPol	16	**5.56**	5.0	6.0	0.294	16	**5.81**	5.4	6.4	0.317	37	**7.21**	6.5	8.0	0.334
LCr	13	**16.37**	16.09	16.63	0.177	22	**16.32**	15.87	16.97	0.262	35	**17.27**	16.59	18.02	0.325
LCb	13	**15.24**	14.93	15.48	0.179	22	**15.16**	14.68	15.73	0.245	35	**16.03**	15.38	16.85	0.329
LaZ	13	**8.55**	8.32	8.79	0.135	21	**8.57**	8.36	8.97	0.137	34	**9.00**	8.65	9.47	0.210
LaI	13	**3.23**	3.07	3.41	0.090	22	**3.21**	2.93	3.48	0.146	35	**3.45**	3.12	3.67	0.140
LaN	13	**8.27**	8.03	8.59	0.167	22	**8.12**	7.62	8.67	0.249	35	**8.50**	7.71	8.83	0.201
ANc	13	**5.30**	5.14	5.42	0.086	22	**5.39**	5.13	5.58	0.114	35	**5.49**	5.28	5.76	0.118
LBT	13	**4.48**	4.33	4.71	0.099	22	**4.37**	4.22	4.57	0.114	35	**4.66**	4.43	4.89	0.127
CC	13	**3.58**	3.42	3.75	0.104	22	**3.62**	3.50	3.88	0.086	35	**3.82**	3.66	4.07	0.098
M^3M^3	12	**5.88**	5.51	6.14	0.182	22	**5.87**	5.66	6.15	0.135	35	**6.24**	5.96	6.61	0.140
CM^3	13	**5.38**	5.13	5.59	0.129	22	**5.36**	5.15	5.64	0.130	35	**5.65**	5.41	5.92	0.119
LMd	13	**10.17**	9.83	10.33	0.167	21	**10.23**	9.88	10.52	0.166	35	**10.94**	10.30	11.46	0.236
ACo	13	**2.99**	2.91	3.06	0.054	21	**2.97**	2.73	3.20	0.105	35	**3.05**	2.67	3.28	0.165
CM_3	13	**5.79**	5.61	6.06	0.130	21	**5.79**	5.37	6.13	0.160	35	**6.19**	5.93	6.75	0.163

	*P. gaisleri** Cyrenaica					*P.* cf. *christii*** N Egypt & S Levant					*P. austriacus** Balkans				
	n	**M**	min	max	SD	n	**M**	min	max	SD	n	**M**	min	max	SD
LAt	19	**39.11**	37.2	40.9	1.002	10	**39.92**	38.1	40.8	0.898	29	**39.80**	37.0	42.3	1.189
LPol	19	**6.38**	6.1	6.8	0.174	10	**5.42**	5.0	5.7	0.230	19	**5.68**	5.3	6.1	0.227
LCr	15	**17.02**	16.54	17.43	0.255	12	**16.92**	16.67	17.72	0.316	29	**17.39**	16.72	17.92	0.327
LCb	15	**15.94**	15.63	16.33	0.213	12	**15.75**	15.43	16.37	0.279	29	**16.30**	15.62	16.76	0.275
LaZ	14	**8.98**	8.78	9.14	0.115	10	**8.55**	8.35	8.78	0.113	29	**9.20**	8.75	9.50	0.182
LaI	15	**3.50**	3.44	3.62	0.049	13	**3.22**	3.02	3.38	0.097	29	**3.38**	3.09	3.55	0.107
LaN	15	**8.29**	8.04	8.76	0.177	13	**8.03**	7.78	8.22	0.144	29	**8.51**	8.12	8.83	0.145
ANc	15	**5.50**	5.36	5.69	0.100	13	**5.30**	5.12	6.02	0.238	29	**5.41**	5.05	5.81	0.164
LBT	15	**4.53**	4.47	4.70	0.060	13	**4.71**	4.48	4.90	0.111	29	**4.67**	4.47	4.81	0.086
CC	15	**3.99**	3.88	4.15	0.081	13	**3.52**	3.20	3.78	0.146	29	**4.11**	3.82	4.37	0.123
M^3M^3	15	**6.23**	6.12	6.34	0.077	13	**6.04**	5.77	6.35	0.188	29	**6.47**	6.08	6.82	0.176
CM^3	15	**5.79**	5.65	5.94	0.078	13	**5.71**	5.58	6.07	0.140	29	**6.01**	5.82	6.26	0.119
LMd	15	**10.90**	10.72	11.17	0.167	13	**10.62**	10.32	11.13	0.212	29	**11.21**	10.86	11.62	0.214
ACo	15	**3.16**	2.83	3.37	0.144	13	**3.00**	2.74	3.17	0.119	29	**3.33**	3.08	3.54	0.124
CM_3	15	**6.18**	5.93	6.32	0.101	13	**6.14**	5.90	6.85	0.269	29	**6.45**	6.23	6.70	0.109

for details on this form see Benda et al. 2006), and *P. gaisleri* Benda, Kiefer, Hanák et Veith, 2004 (Mediterranean Cyrenaica). However, the skull comparison of the Cypriot samples and the eastern Mediterranean representatives of other *Plecotus* species (Figs. 33, 34, Table 4) clearly grouped the bats from mountainous and lowland parts of Cyprus with the Balkan and Anatolian samples of *P. kolombatovici*. This common cluster showed smaller values of skull dimensions than are those of other species and only slightly overlapped with some of their clusters (Fig. 33). Similarly, the results of the principal component analysis (Fig. 34) grouped the Cypriot and other Mediterranean samples of *P. kolombatovici* in one common cluster out of other compared species. The correct species identification of the Cypriot populations as of *P. kolombatovici* was



Figs. 35, 36. Portraits of *Plecotus kolombatovici* Đulić, 1980 from Cyprus (both photos by R. Lučan). 35 (left) – individual from Agırdağ, netted at the entrance of a cleft cave at ca. 560 m a. s. l. 36 (right) – individual from the Troodos Forest, netted at the upper gallery of an abandoned mine 5 km southwest from Kakopetria, at ca. 1665 m a. s. l. (Fig. 10).

confirmed not only by the morphometric comparison (see also the analysis by Benda et al. 2006) but also by a genetic analysis; the individual collected at Agırdağ in Northern Cyprus (Fig. 35) showed identical haplotype with an individual of *P. kolombatovici* from southern Anatolia (Ermenek, Karaman; Juste et al. 2004). Since the examined specimens did not show any remarkable differences in morphology and obviously belonged to an only morphotype (see also Figs. 35, 36), we regard the Cypriot samples to represent one species. External and cranial dimensions of the examined Cypriot specimens of *P. kolombatovici* are shown in Appendix III.

In accordance with these results, we consider *P. kolombatovici* the only *Plecotus* species being confirmed to occur in Cyprus. Another species of the genus known from the Levantine part of the Middle East as well as from Crete and the Balkans, *P. macrobullaris* (see Hanák et al. 2001, Spitzenberger et al. 2006, Benda et al. 2006), which could be expected to occur in Cyprus, remains to be proved.

Miniopterus schreibersii (Kuhl, 1817)

Records. **Original data**: S o u t h e r n C y p r u s: Kakopetria, Troodos Forest, abandoned mine 4 km to SW [1], lower gallery (Figs. 38, 39), 29 March 2005: obs. a colony of ca. 250 inds., coll. 3 ma (NMP 91266, 91267 [S+A], 91265 [A]), 11 April 2005: obs. a colony of ca. 50 inds., coll. 5 ma (NMP 90404–90406 [S+A], 90402, 90403 [A]); 15 October 2005: obs. colony of ca. 70 inds., exam. 57 inds. (2 ma, 4 ms/j, 15 fa, 36 fs/j); – Kalavasos, abandoned mine ca. 3 km to NW

Fig. 37. Records of *Miniopterus schreibersii* (Kuhl, 1817) in Cyprus.

Fig. 38. Entrance to the lower gallery of an abandoned mine in the Troodos Forest, ca. 4 km southwest of Kakopetria, at ca. 1305 m a. s. l. This ca. 200 m long gallery is the highest situated site of occurrence of *Miniopterus schreibersii* in Cyprus; a colony of 50–250 individuals was found there three times in 2005 along with individuals of *Myotis blythii* and *M. nattereri* (photo by I. Horáček).

Fig. 39. Cluster of individuals of *Miniopterus schreibersii* (Kuhl, 1817) found in the lower gallery of an abandoned mine ca. 4 km southwest of Kakopetria (Fig. 38) on 29 March 2005 (photo by I. Horáček).

[2; Fig. 11], 19 April 2005: net. 1 ma (NMP 90434 [S+A]); – Neo Horio, Smigies Trail, ca. 3 km to NW [3], abandoned chromite mine system 'Magnesia Mine', 8 September 2000: obs. a colony of ca. 100 inds. (exam. 3 ma); 27–28 March 2005: net. 3 ma, 6 fa (NMP 91254–91260 [S+A], 91253, 91826 [A]); 12 October 2005: obs. 1 ind. in the mine, net. 9 ma, 1 ms, 1 fa, 9 fs/j (coll. 1 m, 2 f; NMP 91207 [S+A], 91828, 91829 [A]). – **Published data**: S o u t h e r n C y p r u s: Cape Pyla [Akrotira Pyla] [4], small cave in the sea-cliffs, 1 ind. (Bate 1903); – Emba [= Empa] [5] (Paphos), 20 May 1988 [leg. P. Boye] (Kock 1989) = vicinity of Paphos [= Pafos], cave, 20 May 1988: ca. 500 inds. (Boye et al. 1990); March 1989: ca. 30 inds., December 1989: 30–50 inds. (Boye et al. 1990); – Limassol [= Lemesos] [6], a cave to N, March 1988: 10 or more inds. (Boye et al. 1990), 26 March 1989: 6 or more inds. (Boye et al. 1990). – C y p r u s: Cyprus, 1 m (FMNH 44249) (Lay 1967).

Comments. Although *Miniopterus schreibersii* was first mentioned from Cyprus already by Bate (1903), only six accurate record sites are available until now (Fig. 37). This number of localities seems to be rather low in comparison with those of the Mediterranean species showing similar habitat preferences (see e.g. *Rhinolophus ferrumequinum* and/or *R. hipposideros*).

The Cypriot records of *M. schreibersii* come from a rather wide altitude range of ca. 50–1305 m a. s. l. (mean 330 m), however, most of the findings are of a lowland origin. The only 'mountain exception' comes from a mine above Kakopetria (at 1305 m; Fig. 38) where a colony was repeatedly recorded (in this colony, females were found only in autumn, while only males were recorded in spring; Fig. 39). All records are connected with underground shelters; findings inside

underground roosts are prevailing (12 records versus three nettings at the entrances to underground spaces). Occasional checks of colony roosts showed high flexibility in their use (see also the data by Boye et al. 1990); the numbers of *M. schreibersii* found per individual checks varied in two orders of magnitude between the visits (see Records) suggesting large scale seasonal exchanges among shelters within the island. External and cranial dimensions of the examined Cypriot specimens of *M. schreibersii* are shown in Appendix III.

Tadarida teniotis (Rafinesque, 1814)

Records. **Original data**: S o u t h e r n C y p r u s: Apsiou [1], irrigation reservoir, 30 March 2005: det. 1 ind.; – Neo Horio, Petratis gorge ca. 4 km to E [2], 25 March 2005: det. 2 inds.; – Neo Horio, Smigies Trail ca. 3 km to NW [3], at the abandoned chromite mine system 'Magnesia Mine', 12 October 2005: det. & obs. 1 ind.; – Paramytha [4], small cave above a road (Fig. 40), 31 March 2005: coll. 1 ma in a rocky fissure (NMP 91831 [S+A]), repeatedly det. min. 1 another ind.; – Prodromi, Androlikou gorge ca. 2 km to SW [5], 26 March 2005: det. 1 ind.; – Troodos, Troodos Forest 1.5 km to N [6], at an abandoned chromite mine, 29 March 2005: det. min. 1 ind.; 13 October 2005: obs. & det. 2–3 inds.; – Troodos, Troodos Forest ca. 3 km to W [7], at the Hadjipavlou mine (Fig. 16), 14 October 2005: det. 1 ind. – **Published data**: N o r t h e r n C y p r u s: Kyrenia [= Beşparmak] range [8], March 1989: calls of cf. *T. teniotis* (Boye et al. 1990).

Comments. Boye et al. (1990) discussed possible occurrence of *Tadarida teniotis* in Cyprus suggested by a call recorded in the Beşparmak (= Pentadaktylos) Mts in March 1989. This tentative report was accepted by Kryštufek & Vohralík (2005: 235) as a valid evidence of Cypriot distribution of this species. However, an undoubted confirmation of its occurrence on the island is reported here, with a male collected in a small cave at Paramytha (Fig. 40), now representing the first (and only) museum specimen of *T. teniotis* from Cyprus. On the other hand, the presence of this bat in Cyprus was well predictable, considering its relatively common distribution in the southwestern part of Turkey (von Helversen 1989, Benda & Horáček 1998, Karataş et al. 2006).

Fig. 40. Rocky wall above the road near Paramytha; the small cave in this wall is the only known site of collection of *Tadarida teniotis* (Rafinesque, 1814) in Cyprus (also the calls of *Pipistrellus kuhlii* were there recorded) (photo by I. Horáček).

Fig. 41. Records of *Tadarida teniotis* (Rafinesque, 1814) in Cyprus.

Despite the conspicuous *T. teniotis* call, easily audible also to the naked ear, this bat has been recorded rather scarcely in Cyprus; only eight records are available, including the rather uncertain indication vy Boye et al. (1990) (Fig. 41). Most of the findings are call records, no netted individuals are available and only one individual was collected in its shelter (see above). However, the records come from all parts and different altitudes of the island (255–1630 m a. s. l., mean 723 m). The surprisingly scarce occurrence of *T. teniotis* in Cyprus resembles the situation in the Mediterranean part of the Levant (Syria, Lebanon), where records of this bat are rather infrequent despite the abundance of suitable habitats (Benda et al. 2006, our unpubl. data). Cranial dimensions of the Cypriot specimen of *T. teniotis* are shown in Appendix III.

CONCLUSION

The present review summarises at least 195 records of 22 bat species available from the island of Cyprus (Table 1). In comparison with the most recent list of the Cypriot bat fauna by Kryštufek & Vohralík (2001, 2005), four species are here reported to occur in Cyprus for the first time: *Eptesicus anatolicus*, *Pipistrellus pipistrellus*, *Nyctalus leisleri*, and *N. lasiopterus*. Two more species, which had been suggested to inhabit Cyprus, are here confirmed from the island: *Plecotus kolombatovici* and *Tadarida teniotis*. The former species was previously mentioned under an incorrect taxonomic name, suggesting presence of more species in the sense of the modern view (Spitzenberger et al. 2006), but only *P. kolombatovici* was undoubtedly proved to live on the island. On the other hand, the Cypriot occurrence of three bats, *Rhinolophus euryale*, *Myotis capaccinii* and *Nyctalus noctula*, is here considered only tentative and in a need to be further confirmed.

Table 5. List of bat species of the eastern Mediterranean with marked faunal status per individual regions. Legend: SW Turkey = Taurus region according to the regional division of Turkey by Kryštufek & Vohralík (2001); Levant = here the area composed by Lebanon, Turkish province of Hatay, and the Mediterranean parts of Syria, Israel and West Bank (Benda et al. 2006); S Greece = Peloponnese and surrounding islands (Hanák et al. 2001); + = occurrence confirmed; (+) = occurrence published but doubtful (see the text and the relevant literature); – = occurrence unconfirmed; data concerning the occurrence in Crete are based on those by Hanák et al. (2001) and our unpublished records

	Cyprus	SW Turkey	Levant	Crete	S Greece
Rousettus aegyptiacus	+	+	+	–	–
Rhinolophus ferrumequinum	+	+	+	+	+
Rhinolophus hipposideros	+	+	+	+	+
Rhinolophus euryale	(+)	+	+	–	+
Rhinolophus mehelyi	+	+	+	–	+
Rhinolophus blasii	+	+	+	+	+
Myotis myotis	–	+	+	–	+
Myotis blythii	+	+	+	+	+
Myotis bechsteinii	–	+	–	–	+
Myotis nattereri	+	+	+	–	+
Myotis emarginatus	+	+	+	+	+
Myotis aurascens	–	+	+	+	+
Myotis capaccinii	(+)	+	+	+	+
Eptesicus serotinus	+	+	+	+	+
Eptesicus anatolicus	+	+	+	–	–
Hypsugo savii	+	+	+	+	+
Pipistrellus pipistrellus	+	(+)	+	+	+
Pipistrellus pygmaeus	+	–	–	–	+
Pipistrellus nathusii	–	–	–	–	+
Pipistrellus kuhlii	+	+	+	+	+
Nyctalus noctula	(+)	+	+	–	+
Nyctalus leisleri	+	+	–	–	+
Nyctalus lasiopterus	+	+	–	–	–
Plecotus auritus	–	–	–	–	+
Plecotus macrobullaris	–	+	+	+	+
Plecotus austriacus	–	–	–	–	(+)
Plecotus kolombatovici	+	+	+	+	+
Miniopterus schreibersii	+	+	+	+	+
Tadarida teniotis	+	+	+	+	+

The bat fauna of Cyprus covers almost all elements expected for the island. Out of the true Mediterranean fauna of the eastern Mediterranean region (i.e. the area from Greece to Israel), which comprises 29 species, 25 occur in the Asian Mediterranean (the coastal belt from SW Turkey to N Israel). From this number, only *Myotis myotis* (Borkhausen, 1797), *M. bechsteinii* (Kuhl, 1817), *M. aurascens* Kusjakin, 1935, and *Plecotus macrobullaris* Kuzjakin, 1965 have not been found in Cyprus, while in the Asian Mediterranean, *Pipistrellus pygmaeus* has not been documented to occur but has been found in Cyprus (Table 5). From the missing faunal elements, particularly *M. aurascens* and *P. macrobullaris* could potentially enrich the faunal list of Cyprus. Since *P. macrobullaris* has been found in Crete (Juste et al. 2004), an island more isolated from the mainland shore, where it lives in sympatry with *P. kolombatovici*, as well as in the Levant (see Benda et al. 2006), its occurrence in Cyprus is quite likely. Similarly, *M. aurascens* has been found both in Crete and the Levant (Benda & Karataş 2005) and its record in Cyprus should thus be expected. In comparison with the situation in Crete, the second largest island in the eastern Mediterranean region, the Cypriot bat fauna conforms better to the fauna of close mainland. In

Crete, only two *Pipistrellus* species have been found, none of the genus *Nyctalus*, but two *Plecotus* species are present while *Myotis nattereri* is missing (Table 5).

As pointed out above, the Cypriot bat fauna most resembles that of the Mediterranean Levant by its composition, both faunas sharing unique elements of the easternmost Mediterranean, such as *Rousettus aegyptiacus*, *Myotis blythii omari*, *Eptesicus serotinus shiraziensis* or *E. anatolicus*. On the other hand, the presence of several faunal elements as well as the preliminary genetic comparison in one species clearly showed partial affinity of the Cypriot fauna to European and Cretan faunas. The species *Pipistrellus pygmaeus*, *Nyctalus leisleri* and *N. lasiopterus* have their centre of distribution in Europe, while their Cypriot presence is an isolated stretch of the main range situated westwards. Preliminary results of genetic analyses proved closer relationships of several Cypriot populations of *R. ferrumequinum* to the populations from Crete and Europe than to populations from the Middle East. These proximities directed to two regions of the eastern Mediterranean clearly suggested at least two colonisation episodes when mainland bats (and possibly not only bats) reached the island. One, most probably older colonisation wave brought contemporary European fauna to Cyprus and another wave came to the island (perhaps later) from Asia Minor, after colonisation of this peninsula. Of course, such colonisation events might have occurred more frequently and even repeatedly in some species, but without any doubts bat colonisation of Cyprus was due to several events or during an extended period.

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APPENDIX I
Gazetteer

Only the originally recorded sites are mentioned. The coordinates and altitudes were measured by the GPS in the field; those taken from a map are in brackets.

Afendrika (= Panagia Afentrika [Παναγια Αφεντρικα]), ruins, İskele Dist., 35° 39' N, 34° 26' E, ca. 25 m a. s. l.; – **Agia Napa** [Αγια Ναπα], Ammohostos Dist. [34° 59' N, 34° 00' E, ca. 50 m a. s. l.]; – **Agios Epiktitos** [Αγιος Επικτιτος], Girne Dist. [35° 19' N, 33° 23' E, ca. 70 m a. s. l.]; – **Agios Nikolaos** [Αγιος Νικολαος], Diarizos river ca. 3 km to N, Kelefou (Tzelefou) bridge, Pafos Dist., 34° 53' N, 32° 45' E, ca. 425 m a. s. l.; – **Agırdağ** (= Agirda [Αγιρδα]), cleft cave, Girne Dist., 35° 18' N, 33° 15' E, ca. 560 m a. s. l.; – **Apliç** (= Apliki [Απλικι]), inflow of the Setrahos river into a dam ca. 4 km to S, Lefkosia Dist., 35° 04' N, 32° 50' E, ca. 280 m a. s. l.; – **Apsiou** [Αψιου], irrigation reservoir, Lemesos Dist., 34° 48' N, 33° 01' E, ca. 445 m a. s. l.; – **Ayios Philion** (= Agios Filon [Αγιος Φιλον]), ruins, İskele Dist., 35° 38' N, 34° 22' E, ca. 30 m a. s. l.; – **Beylerbeyi**, Bellapais Abbey ruins, Girne Dist., 35° 18' N, 33° 21' E, ca. 140 m a. s. l.; – **Çınarlı** (= Platani [Πλατανι]), Inçirli cave ca. 4 km to SE, Gazimağusa Dist., 35° 19' N, 33° 46' E, ca. 240 m a. s. l.; – **Gazimağusa** (= Ammohostos [Αμμόχωστος]), citadel & old town, Gazimağusa Dist., 35° 08' N, 33° 57' E, ca. 15 m a. s. l.; – **Kakopetria** [Κακοπετρια], Troodos Forest, mine 5 km to SW (upper gallery), Lefkosia Dist., 34° 57' N, 32° 52' E, ca. 1665 m a. s. l.; – **Kakopetria** [Κακοπετρια], Troodos Forest, mine 4.5 km to SW (middle gallery), Lefkosia Dist., 34° 58' N, 32° 52' E, ca. 1450 m a. s. l.; – **Kakopetria** [Κακοπετρια], Troodos Forest, mine 4 km to SW (lower gallery), Lefkosia Dist., 34° 58' N, 32° 52' E, ca. 1305 m a. s. l.; – **Kalavasos** [Καλαβασος], mine ca. 3 km to NW, Larnaka Dist., 34° 48' N, 33° 16' E, ca. 130 m a. s. l.; – **Kalavasos** [Καλαβασος], Vasilikos river, Larnaka Dist., 34° 46' N, 33° 18' E, ca. 65 m a. s. l.; – **Kaleburnu** (= Galinoporni [Γαληνοπορνη]), İskele Dist. [35° 31' N, 34° 18' E, ca. 85 m a. s. l.]; – **Kantara** (= Kantara [Κανταρα]), Kantara castle ruins 3 km to NE, İskele Dist., 35° 24' N, 33° 55' E, ca. 625 m a. s. l.; – **Kynousa** [Κινουσα], pine forest 1 km to E, Pafos Dist. [35' 02' N, 32° 32' E, ca. 400 m a. s. l.]; – **Lefkoşa** (= Lefkosia [Λευκωσια]), northeastern margin of the town, Lefkoşa Dist. [ca. 35° 13' N, 33° 20' E, ca. 150 m a. s. l.]; – **Lemesos** [Λεμεσος], touristic resort ca. 4 km to E, Lemesos Dist., 34° 43' 33° 07' E, ca. 15 m a. s. l.; – **Neo Horio** [Νεο Χωριο], Loutra tis Afroditis [Λογτρα της Αφροδιτης] ('Baths of Aphrodite') ca. 4 km to NNW, Akamas Peninsula, Pafos Dist., 35° 03' N, 32° 21' E, ca. 50 m a. s. l.; – **Neo Horio** [Νεο Χωριο], Petratis Gorge ca. 4 km to E, Pafos Dist., 35° 00' N, 32° 22' E, ca. 205 m a. s. l.; – **Neo Horio** [Νεο Χωριο], Smigies Trail ca. 3 km to NW, abandoned chromite mine system 'Magnesia Mine', Akamas Peninsula, Pafos Dist., 35° 03' N, 32° 20' E, ca. 305 m a. s. l.; – **Pano Lefkara** [Πανω Λευκαρα], road bridge ca. 3 km to NW, below the Lefkara Dam, Larnaka Dist., 34° 54' N, 33° 18' E, ca. 255 m a. s. l.; – **Paramali** [Παραμαλι], disused stream ford 2 km to SW, Lemesos Dist. (Akrotiri Sovereign Base Area), 34° 41' N, 32° 50' E, ca. 30 m a. s. l.; – **Paramytha** [Παραμιθα], small cave, Lemesos Dist., 34° 47' N, 32° 59' E, ca. 420 m a. s. l.; – **Perivolia** [Περιβολια], Larnaka Dist., 34' 49' N, 33° 35' E, ca. 18 m a. s. l.; – **Prodromi** [Προδρομι], Androlikou gorge ca. 2 km to SW, Akamas Peninsula, Pafos Dist., 35° 00' N, 32° 23' E, ca. 255 m a. s. l.; – **Protaras** [Προταρας], cliff cave, Ammohostos Dist., 35° 01' N, 34° 03' E, ca. 35 m a. s. l.; – **Sourp Magar Ermeni Manastiri** (= Armenomonastiro [Αρμενομοναστηρο]), monastery ruins, Girne Dist. [35° 17' N, 33° 31' E, ca. 500 m a. s. l.]; – **St. Hilarion Castle** (= Agios Illarion [Αγιος Ιλλαριων]), cave below the castle, Girne Dist., 35° 19' N, 33° 17' E, ca. 690 m a. s. l.; – **Steni** [Στενη], small cave 1.5 km to E, Pafos Dist., 35° 00' N, 32° 29' E, ca. 120 m a. s. l.; – **Trikomo** [Τρικομο, İskele], İskele Dist., 35° 17' N, 33° 53' E, ca. 26 m a. s. l.; – **Troodos** [Τρόοδος], Kryos River ca. 2 km to SW, upper end of the Kalidonia Trail, Lemesos Dist., 34° 55' N, 32° 52' E, ca. 1595 m a. s. l.; – **Troodos** [Τροοδος], Troodos Forest, Hadjipavlou mine 3 km to W, Lemesos Dist., 34° 56' N, 32° 53' E, ca. 1630 m a. s. l.; – **Troodos** [Τροοδος], Troodos Forest, mine 1.5 km to N, Lemesos Dist., 34° 57' N, 32° 53' E, ca. 1505 m a. s. l.; – **Troodos** [Τρόοδος], Troodos Forest, small pools 3 km to NNW, Lefkosia Dist., 34° 57' N, 32° 52' E, ca. 1770 m a. s. l.; – **Vretsia** [Βρετσια], Xeros river ca. 2 km to E, 500 m to S of the Roudias bridge, Pafos Dist., 34° 53' N, 32° 41' E, ca. 325 m a. s. l.; – **Yedikonuk** (= Eptakómi [Επτακομι]), sea shore cave ca. 2 km to N, Mehmetçik Dist., 35° 28' N, 34° 02' E, ca. 80 m a. s. l.

APPENDIX II

GenBank Accessite Numbers of the examined Cypriot bat specimens

species	Accession No.	voucher	site
Rousettus aegyptiacus	EU086526	biopsy	Akamas, Androlikou gorge
Myotis nattereri	EU086527	NMP 91251	Akamas, Smigies Trail
Pipistrellus pipistrellus	EU084891	MHNG 1807.089	Troodos, Kryos river
Pipistrellus pygmaeus	AJ504442	MHNG 1807.090	Troodos, Kryos river
Pipistrellus pygmaeus	EU084883	NMP 90413	Troodos, Kryos river
Plecotus kolombatovici	EU086528	NMP 91268	Agırdağ

APPENDIX III

Biometric data on the bats from Cyprus

Basic external and cranial measurements of the examined bat specimens collected in Cyprus (pp. 126–130). For collection acronyms and measurement abbreviations see p. 71. Arranged in alphabetical and numerical orders, according to collection acronyms and numbers.

coll. No.	site	sex	age	G	LC	LCd	LAt	LA	LCr	LCb/c	LaZ	LaI	LaN	ANc	CC	M^3M^3	CM^3	LMd	ACo	CM_3
Rousettus aegyptiacus																				
NMP 90399	Akamas	–	a	–	–	–	–	–	45.19	43.57	28.74	7.62	17.93	13.11	–	–	16.87	35.19	16.34	18.48
NMP 90435	Akamas	m	a	158.0	155	17	96.3	21.2	44.48	42.52	27.44	8.07	17.19	17.95	9.33	13.29	17.44	34.32	15.38	18.57
NMP 91274	Akamas	m	s	–	135	17	90.0	22.5	42.18	40.93	24.67	7.97	16.81	11.81	8.83	12.61	16.23	32.77	13.92	17.81
Rhinolophus ferrumequinum																				
NMP 90425	Çınarlı	m	a	13.3	69	35	54.6	25.8	24.19	20.83	12.18	2.37	9.18	6.90	6.87	8.47	8.84	16.02	4.08	9.52
NMP 90432	Kalavasos	f	a	19.9	70	41	57.9	25.8	23.90	20.77	12.46	2.54	9.53	7.07	6.77	8.61	8.89	15.75	4.12	9.52
NMP 91204	Akamas	f	a	–	68	33	57.5	21.8	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91205	Akamas	f	a	23.0	70	39	58.0	23.0	24.52	21.12	12.45	2.37	9.53	7.13	6.63	8.66	8.54	15.94	4.14	8.92
NMP 91206	Akamas	f	a	22.5	67		55.0	21.5	23.58	20.60	12.12	2.34	9.44	7.52	7.08	8.59	8.64	15.78	4.14	9.33
NMP 91225	Troodos Forest	m	a	16.3	70	33	56.0	22.5	24.65	21.07	12.53	2.43	9.73	7.12	6.76	8.57	8.97	16.48	4.17	9.76
NMP 91234	Çınarlı	m	a	14.3	60	38	57.7	24.0	24.10	20.92	12.28	2.52	9.56	7.27	6.96	9.02	9.09	15.91	4.05	9.78
NMP 91235	Afendrika	m	a	17.5	64	38	55.5	23.0	–	21.00	12.35	2.08	9.31	7.26	6.92	8.69	8.83	16.08	4.28	9.58
NMP 91248	Akamas	f	s	16.0	63	38	55.5	24.7	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91249	Akamas	m	a	15.0	60	36	54.7	22.2	24.23	20.97	12.71	2.21	9.59	7.38	6.86	8.93	8.98	16.37	3.98	9.63
NMP 91250	Akamas	f	a	16.5	60	38	54.5	23.0	23.76	20.46	12.31	2.68	9.62	7.34	6.66	8.61	8.59	15.76	3.76	9.32
Rhinolophus hipposideros																				
NMP 90424	Çınarlı	m	a	3.5	38	26	36.8	17.2	16.10	13.51	7.27	1.52	6.48	4.58	3.47	5.42	5.49	9.53	2.02	5.61
NMP 90923	Troodos Forest	m	s/a	4.2	42	29	35.5	17.7	–	–	–	–	–	–	–	–	–	–	–	–
NMP 90924	Troodos Forest	m	a	4.1	41	27	37.3	17.4	15.97	13.31	7.44	1.91	6.60	4.72	3.51	5.18	5.31	9.53	2.09	5.33
NMP 90925	Troodos Forest	m	a	3.5	40	29	37.1	18.7	15.92	13.26	7.26	1.81	6.32	4.35	3.18	5.17	5.21	9.37	1.88	5.48
NMP 90926	Troodos Forest	f	a	3.7	40	25	35.2	16.8	–	12.82	7.17	1.56	6.15	4.42	3.25	5.02	5.14	9.13	1.81	5.23
NMP 90927	Troodos Forest	m	a	4.0	43	27	36.9	17.8	–	13.42	7.38	1.82	6.45	4.58	3.36	5.27	5.41	9.38	1.96	5.52
NMP 90928	Troodos Forest	f	a	3.9	41	27	37.5	18.1	15.92	13.28	7.49	1.46	6.37	4.47	–	5.13	5.14	9.40	2.13	5.22
NMP 91229	Troodos Forest	m	s	3.9	38	27	37.0	16.0	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91247	Akamas	m	–	3.3	38	23	34.4	16.7	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91261	Troodos Forest	m	a	3.7	36	24	35.0	17.2	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91262	Troodos Forest	m	a	3.2	39	24	36.0	16.0	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91263	Troodos Forest	m	–	3.5	33	25	36.9	16.8	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91269	Çınarlı	m	–	3.5	39	30	36.3	17.4	15.98	13.44	7.58	1.46	6.48	4.52	3.36	5.20	5.37	9.49	2.16	5.59
NMP 91270	Çınarlı	m	–	3.0	37	25	36.6	17.5	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91821	Akamas	m	s	3.0	36	25	36.5	15.8	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91822	Akamas	m	a	3.0	37	23	36.2	17.5	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91823	Akamas	f	s	4.0	39	25	37.3	19.0	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91824	Akamas	f	s	3.0	39	27	36.2	17.7	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91825	Akamas	m	a	3.5	40	27	37.4	16.0	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91827	Troodos Forest	m	–	4.0	40	27	35.2	17.0	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91830	Çınarlı	f	j	3.3	38	26	36.8	15.8	–	–	–	–	–	–	–	–	–	–	–	–

coll. No.	site	sex	age	G	LC	LCd	LAt	LA	LTr	LCr	LCb/c	LaZ	LaI	LaN	ANc	CC	M^3M^3	CM^3	LMd	ACo	CM_3
Rhinolophus blasii																					
NMP 90433	Kalavasos	m	a	7.9	59	26	46.1	20.2	–	19.22	16.47	9.14	2.47	8.34	5.92	4.49	6.47	6.61	11.57	2.48	6.88
NMP 90929	Troodos Forest	f	a	9.3	55	26	47.1	21.3	–	19.58	16.57	9.23	2.23	8.37	6.31	4.38	6.34	6.57	11.69	2.66	6.69
NMP 90930	Troodos Forest	f	s/a	9.6	56	32	46.4	21.0	–	19.50	16.63	9.21	2.19	8.33	6.18	4.33	6.41	6.63	11.86	2.78	6.83
Myotis blythii																					
NMP 90426	Çınarlı	m	a	–	72	65	56.1	26.9	10.5	22.17	21.28	14.61	4.92	9.62	7.68	5.82	9.07	9.37	16.92	5.56	9.97
NMP 91230	Troodos Forest	m	s	24.0	73	61	59.0	24.5	11.0	22.39	21.17	14.25	5.16	9.71	7.83	5.92	9.18	9.21	16.92	5.66	9.92
Myotis nattereri																					
NMP 90418	Apliç	f	a	7.0	47	48	37.6	18.8	10.2	15.63	14.57	10.04	3.67	7.91	5.79	4.06	6.44	6.02	11.14	3.35	6.41
NMP 90427	Çınarlı	f	a	6.6	48	51	40.5	19.1	10.5	–	–	–	–	–	–	–	–	–	–	–	–
NMP 90428	Çınarlı	f	a	9.7	50	51	42.4	19.5	11.2	–	–	–	–	–	–	–	–	–	–	–	–
NMP 90429	Çınarlı	f	a	9.9	46	53	42.9	19.6	11.0	16.60	15.28	10.02	3.51	7.98	5.66	3.89	6.39	6.28	11.82	3.54	6.61
NMP 90430	Çınarlı	f	a	6.3	42	50	41.3	19.4	10.0	15.92	14.97	9.87	3.63	7.67	5.58	4.12	6.43	6.34	11.52	3.47	6.72
NMP 91208	Troodos Forest	m	s	6.0	46	47	41.0	18.3	11.3	16.20	14.88	9.98	3.84	7.82	5.67	4.09	6.24	6.28	11.44	3.39	6.67
NMP 91211	Troodos Forest	f	s	7.5	50	49	42.5	17.0	10.5	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91212	Troodos Forest	f	s	–	49	49	40.7	18.5	11.0	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91213	Troodos Forest	m	s	6.5	46	48	40.5	17.5	11.7	16.52	15.39	10.31	3.69	7.96	5.86	3.97	6.42	6.31	11.76	3.41	6.68
NMP 91214	Troodos Forest	m	s	6.3	50	46	40.5	–	11.5	15.92	15.02	9.86	3.61	7.58	5.58	4.07	6.45	6.18	11.52	3.42	6.61
NMP 91215	Troodos Forest	m	s	5.5	46	45	40.3	16.0	10.3	15.61	14.59	9.58	3.74	7.51	5.76	4.03	6.14	6.05	11.18	3.21	6.43
NMP 91216	Troodos Forest	m	a	5.6	43	48	39.5	18.5	11.2	16.02	15.03	9.98	3.59	7.76	5.53	4.01	6.34	6.18	11.34	3.34	6.42
NMP 91217	Troodos Forest	f	s	8.0	51	48	39.5	16.5	11.5	15.74	14.75	10.12	3.54	7.91	5.74	4.17	6.57	6.07	11.28	3.56	6.54
NMP 91218	Troodos Forest	m	s	6.5	45	48	40.0	16.5	10.5	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91221	Troodos Forest	m	s	6.5	46	46	39.7	17.6	11.2	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91222	Troodos Forest	m	s	6.0	44	43	39.5	17.4	10.9	15.63	14.57	9.69	3.59	7.74	5.63	3.98	6.27	5.94	11.13	3.29	6.47
NMP 91226	Troodos Forest	m	s	6.1	46	46	39.6	18.5	11.1	15.98	14.76	10.14	3.68	8.12	5.76	4.02	6.24	6.11	11.38	3.26	6.47
NMP 91227	Troodos Forest	m	a	6.5	49	48	40.0	17.8	11.3	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91231	Troodos Forest	f	s	7.3	50	50	40.3	17.5	11.3	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91232	Çınarlı	f	s	6.6	48	46	40.5	16.5	10.8	15.88	14.83	9.98	3.47	7.83	5.59	3.95	6.44	6.21	11.41	3.47	6.57
NMP 91233	Çınarlı	m	s	5.5	51	47	40.5	17.5	10.5	16.03	15.04	9.63	3.53	7.75	5.69	3.94	6.24	6.33	11.61	3.31	6.72
NMP 91251	Akamas	m	–	6.0	45	47	39.7	17.3	11.7	15.83	14.73	9.92	3.48	7.84	5.82	3.95	6.29	5.92	11.39	3.37	6.33
NMP 91252	Akamas	m	–	5.5	49	47	39.4	16.5	10.8	15.67	14.68	9.92	3.82	7.79	5.71	4.17	6.28	6.12	11.35	3.22	6.51
NMP 91271	Çınarlı	f	–	7.0	45	49	42.0	18.0	10.2	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91272	Çınarlı	f	–	7.0	49	47	38.5	16.6	10.6	15.39	14.50	–	3.62	7.70	5.74	3.93	6.18	5.88	11.14	3.17	6.34
NMP 91273	Çınarlı	f	–	8.0	47	46	41.5	18.4	10.6	16.18	15.12	9.86	3.69	7.57	5.38	3.95	6.43	6.26	11.68	3.37	6.68
Myotis emarginatus																					
NMP 90400	Troodos Forest	f	a	6.4	50	52	42.1	19.1	9.2	15.92	15.08	9.63	3.47	7.17	5.53	4.22	6.17	6.54	11.79	3.53	6.89
NMP 90401	Troodos Forest	f	a	5.4	52	45	41.0	18.3	9.3	15.58	14.89	10.02	3.50	7.33	5.48	4.18	6.33	6.39	11.67	3.59	6.71
NMP 90931	Troodos Forest	m	a	5.9	45	46	38.3	18.0	8.8	15.42	14.37	9.44	3.58	7.18	5.68	4.48	5.93	6.26	11.26	3.36	6.63
NMP 90932	Troodos Forest	m	a	5.8	45	46	38.7	17.6	9.7	15.68	14.74	9.63	3.64	7.21	5.62	4.07	6.03	6.41	11.47	3.57	6.74

coll. No.	site	sex	age	G	LC	LCd	LAt	LA	LTr	LCr	LCb	LaZ	LaI	LaN	ANc	CC	M^3M^3	CM^3	LMd	ACo	CM_3
Myotis emarginatus																					
NMP 90933	Troodos Forest	m	a	5.8	45	46	37.5	19.1	8.4	15.57	14.56	9.54	3.43	7.26	5.51	3.95	6.14	6.34	11.28	3.32	6.72
NMP 90934	Troodos Forest	m	a	6.1	46	46	38.7	18.0	9.5	15.76	14.81	9.76	3.61	7.41	5.63	4.07	6.02	6.35	11.48	3.68	6.71
NMP 90935	Troodos Forest	m	a	6.1	47	47	38.1	18.9	8.5	15.70	14.67	9.58	3.58	7.49	5.77	3.86	5.91	6.31	11.43	3.56	6.68
NMP 90936	Troodos Forest	m	a	6.3	48	47	38.2	18.3	8.4	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91264	Troodos Forest	f	s	–	45	42	40.0	17.2	9.8	15.53	14.56	9.53	3.46	7.37	5.56	4.02	6.17	6.37	11.46	3.42	6.64
Eptesicus serotinus																					
NMP 90409	Troodos Forest	m	a	20.6	81	59	56.5	23.9	8.6	22.78	21.75	14.76	4.43	9.61	7.47	7.03	8.49	8.42	16.98	6.48	9.57
NMP 90919	Gazimağusa	f	a	30.2	84	69	56.4	25.7	9.5	23.11	21.93	15.43	4.26	9.92	7.93	7.17	9.07	8.46	17.19	6.62	9.56
NMP 91219	Troodos Forest	m	s	27.8	80	63	54.0	21.5	8.5	22.26	21.26	15.32	4.52	10.39	7.54	7.02	8.92	8.17	16.74	6.40	9.11
Eptesicus anatolicus																					
NMP 90922	Kantara	m	a	14.3	69	49	46.1	20.6	7.2	17.84	17.20	12.12	3.92	8.66	6.51	5.27	7.73	6.38	12.61	4.53	7.07
Hypsugo savii																					
NMP 90407	Troodos Forest	m	a	5.3	47	37	33.8	15.1	5.5	13.53	13.23	8.84	3.68	6.97	4.42	4.53	6.12	4.66	9.65	2.81	5.08
NMP 90410	Troodos Forest	m	a	5.4	52	44	35.9	16.1	5.5	13.89	13.61	9.14	3.48	6.72	4.49	4.71	5.72	4.64	9.93	2.88	4.98
NMP 90431	Kantara	m	a	5.8	53	40	36.1	15.0	4..7	13.58	13.01	8.84	3.59	6.74	4.58	4.18	5.94	4.61	9.19	2.84	4.91
NMP 91210	Troodos Forest	m	a	6.8	50	41	34.0	12.4	5.5	13.83	13.61	8.42	3.33	6.57	4.47	4.29	5.80	4.74	9.61	2.73	5.12
NMP 91220	Troodos Forest	f	a	7.0	51	40	35.5	13.0	5.5	13.48	13.21	8.75	3.35	6.84	4.53	4.37	5.87	4.74	9.73	2.90	5.07
Pipistrellus pipistrellus																					
MHNG 1807.089	Troodos F.	m	a	5.0	–	–	29.6	8.0	–	11.78	11.24	7.32	3.06	6.01	4.23	3.55	4.87	4.11	8.15	2.39	4.42
Pipistrellus pygmaeus																					
MHNG 1807.090	Troodos F.	m	a	5.0	–	–	30.3	7.8	–	11.78	11.37	7.48	3.02	6.19	4.27	3.58	4.84	4.29	8.14	2.57	4.50
MHNG 1807.091	Troodos F.	m	a	5.0	–	–	29.7	8.0	–	11.74	11.33	7.40	2.90	5.81	4.17	3.55	4.88	4.21	8.21	2.34	4.32
NMP 90408	Troodos Forest	m	a	3.6	41	34	29.5	12.5	5.4	11.74	11.47	7.57	3.07	6.02	4.25	3.77	5.07	4.28	8.22	2.56	4.51
NMP 90413	Troodos Forest	m	s	3.2	40	34	28.8	12.7	4.9	11.67	11.27	7.43	3.02	6.24	4.17	3.67	4.93	4.27	8.32	2.38	4.47
NMP 90414	Troodos Forest	m	a	3.7	40	33	30.0	12.0	4.2	11.91	11.34	7.39	3.09	6.08	4.14	3.59	4.97	4.21	8.22	2.41	4.47
NMP 90415	Troodos Forest	f	s	3.2	41	35	29.4	12.4	5.2	11.76	11.28	7.43	2.93	6.08	4.22	3.55	4.92	4.12	8.14	2.44	4.37
NMP 90416 **T**	Troodos Forest	m	a	3.7	41	36	30.1	12.4	4.5	11.75	11.33	7.27	2.94	6.07	4.32	3.54	4.75	4.23	8.38	2.38	4.48
NMP 90417	Troodos Forest	m	a	4.1	45	34	31.3	12.7	5.5	12.43	11.85	7.82	3.18	6.14	4.22	3.67	5.12	4.41	8.64	2.44	4.75
NMP 90419	Kelefou bridge	f	a	4.0	43	35	31.1	11.9	5.2	11.75	11.54	–	3.07	6.04	4.23	3.66	5.02	4.33	8.39	2.61	4.53
NMP 90420	Kelefou bridge	m	a	2.9	42	33	28.5	13.3	4.6	11.42	10.90	7.34	2.88	5.81	3.96	3.52	4.73	4.04	8.07	2.43	4.29
NMP 90421	Kelefou bridge	f	a	3.8	39	36	29.9	12.4	5.3	11.62	11.09	7.43	3.12	6.04	4.18	3.61	5.00	4.09	8.21	2.41	4.28
NMP 90422	Kelefou bridge	f	a	3.7	44	36	31.3	12.7	5.2	12.34	11.79	7.76	3.04	6.26	4.33	3.83	4.93	–	8.87	2.61	–
NMP 90423	Kelefou bridge	f	a	3.5	39	35	30.0	12.7	5.5	11.55	11.12	–	3.02	6.07	4.25	3.57	4.86	4.17	8.12	2.49	4.44
Pipistrellus kuhlii																					
NMP 90920	Afendrika	f	a	6.2	51	42	34.3	13.7	5.4	13.07	12.33	–	3.28	6.61	4.82	4.18	5.56	4.74	9.41	3.03	5.13
NMP 90921	Afendrika	m	a	5.7	46	42	34.0	14.2	5.9	12.93	12.62	8.41	3.18	6.42	4.56	3.97	5.71	4.75	9.34	2.86	5.11

coll. No.	site	sex	age	G	LC	LCd	LAt	LA	LTr	LCr	LCb	LaZ	LaI	LaN	ANc	CC	M^3M^3	CM^3	LMd	ACo	CM_3
Pipistrellus kuhlii																					
NMP 91236	Afendrika	m	a	5.8	46	37	31.0	12.2	6.4	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91237	Afendrika	f	s	5.8	44	37	35.0	11.5	6.2	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91238	Afendrika	m	a	5.5	44	38	33.7	11.0	6.2	12.97	12.63	8.53	3.07	6.47	4.58	4.22	5.61	4.81	9.52	2.90	5.19
NMP 91239	Afendrika	m	a	6.7	46	41	33.4	12.2	6.1	13.52	12.77	8.82	3.41	6.58	4.52	4.32	5.82	4.87	9.54	3.04	5.22
NMP 91240	Afendrika	f	a	6.3	47	36	33.0	11.2	5.9	13.62	13.07	–	3.24	6.42	4.84	4.28	5.70	5.12	9.64	2.89	5.43
NMP 91241	Afendrika	m	s	5.0	46	38	33.0	11.0	6.7	12.93	12.39	8.73	3.42	6.52	4.56	4.25	5.87	4.87	9.38	3.02	5.26
NMP 91242	Afendrika	f	a	6.0	45	41	34.3	12.2	6.4	13.21	12.89	8.47	3.29	6.35	4.64	4.19	5.84	4.83	9.56	2.89	5.12
NMP 91243	Afendrika	m	a	6.4	48	38	33.0	11.3	6.1	13.08	12.57	8.51	3.19	6.59	4.61	4.11	5.53	4.76	9.41	2.98	5.02
NMP 91244	Afendrika	m	a	5.9	45	42	35.0	13.0	6.4	12.92	12.51	8.64	3.22	6.41	4.58	4.12	5.80	4.82	9.50	3.16	5.18
NMP 91245	Afendrika	m	a	7.0	46	39	34.5	13.2	5.9	13.41	13.02	8.83	3.21	6.48	4.82	4.33	5.64	5.02	9.71	3.12	5.38
NMP 91246	Afendrika	f	a	5.3	48	–	33.0	11.3	6.2	–	–	–	–	–	–	–	–	–	–	–	–
Nyctalus leisleri																					
NMP 90411	Troodos Forest	m	a	12.9	66	43	41.5	18.0	6.8	15.21	15.27	10.61	4.77	8.54	5.63	5.87	7.21	5.84	11.42	3.52	6.33
NMP 90412	Troodos Forest	f	a	15.0	65	48	42.5	18.4	7.0	15.38	15.52	10.84	4.97	8.57	5.69	5.73	7.20	5.74	11.52	3.27	6.08
NMP 90901	Troodos Forest	m	a	13.7	68	46	43.0	19.2	6.2	15.37	15.63	10.68	4.92	8.37	5.46	5.47	6.74	5.76	11.75	3.17	6.28
NMP 90902	Troodos Forest	m	a	12.2	65	41	42.4	18.8	5.9	15.19	15.34	10.46	4.64	8.28	5.34	5.58	6.90	5.86	11.36	3.28	6.14
Nyctalus lasiopterus																					
NMP 90913	Vretsia	f	a	46.3	106	70	67.3	26.1	9.6	22.87	22.88	15.69	5.64	11.92	8.06	9.00	11.09	8.98	17.59	5.56	9.82
NMP 90914	Vretsia	f	a	44.2	101	67	66.2	26.2	9.7	21.63	22.68	15.44	5.97	12.01	8.01	8.24	10.41	8.96	17.61	5.27	9.57
NMP 90915	Vretsia	f	a	45.1	98	65	63.8	25.3	10.8	21.17	21.75	15.22	5.48	11.58	8.03	8.51	10.46	8.82	16.74	5.21	9.41
NMP 90916	Vretsia	f	a	48.8	99	76	66.1	26.7	10.0	21.75	22.41	15.83	5.71	11.74	8.07	9.19	10.97	8.83	17.47	5.52	9.40
NMP 90917	Vretsia	f	a/s	40.2	94	68	68.1	25.6	10.5	–	–	–	–	–	–	–	–	–	–	–	–
NMP 90918	Vretsia	m	s/j	46.2	101	67	66.8	25.8	9.2	22.16	22.83	15.89	5.82	11.36	7.87	8.97	10.69	8.81	17.68	5.19	9.58
Plecotus kolombatovici																					
NMP 90398	Akamas	m	a	6.0	52	50	38.0	37.3	15.4	16.24	15.28	8.61	3.41	8.40	5.42	3.69	5.83	5.42	10.24	3.02	5.79
NMP 90903	Troodos Forest	f	a	6.5	49	55	38.0	39.9	17.2	16.63	15.48	8.34	3.23	8.08	5.14	3.63	6.14	5.59	10.28	3.06	6.06
NMP 90904	Troodos Forest	f	a	6.7	49	53	39.6	40.0	17.5	16.44	15.38	8.74	3.30	8.48	5.36	3.75	–	5.43	10.27	3.03	5.89
NMP 90905	Troodos Forest	f	a	6.5	51	54	39.3	38.5	16.0	16.62	15.43	8.43	3.07	8.03	5.21	3.49	5.97	5.48	10.33	3.04	5.91
NMP 90906	Troodos Forest	f	a	5.8	50	50	38.3	39.9	17.0	16.38	15.39	8.53	3.29	8.24	5.27	3.43	5.81	5.35	10.24	2.91	5.82
NMP 90907	Troodos Forest	f	a	6.7	49	53	39.7	38.5	16.2	16.31	15.14	8.53	3.14	8.07	5.28	3.58	5.93	5.13	9.83	3.02	5.63
NMP 90908	Troodos Forest	f	a	6.6	46	52	37.5	37.6	14.5	16.28	14.97	8.61	3.27	8.37	5.34	3.51	5.51	5.28	10.12	2.94	5.64
NMP 90909	Troodos Forest	f	a	6.8	52	51	40.7	39.0	16.3	–	–	–	–	–	–	–	–	–	–	–	–
NMP 90910	Troodos Forest	m	a	6.1	50	50	37.7	38.8	16.4	16.13	15.08	8.32	3.18	8.16	5.24	3.42	5.68	5.27	9.98	2.94	5.71
NMP 90911	Troodos Forest	m	a	6.6	51	48	36.5	38.4	15.8	16.09	14.93	8.52	3.19	8.35	5.28	3.48	5.76	5.24	9.89	2.91	5.61
NMP 90912	Troodos Forest	m	a/s	6.1	49	48	38.5	38.8	17.0	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91209	Troodos Forest	f	s	7.5	43	49	38.0	37.5	16.7	16.53	15.34	8.61	3.12	8.59	5.40	3.63	6.04	5.49	10.32	3.02	5.91
NMP 91223	Troodos Forest	f	a	7.0	46	51	38.2	37.5	16.5	–	–	–	–	–	–	–	–	–	–	–	–

coll. No.	site	sex	age	G	LC	LCd	LAt	LA	LTr	LCr	LCb	LaZ	LaI	LaN	ANc	CC	M^3M^3	CM^3	LMd	ACo	CM_3
Plecotus kolombatovici																					
NMP 91224	Troodos Forest	m	a	6.6	46	49	38.2	36.0	16.2	16.33	15.18	8.79	3.26	8.29	5.29	3.58	5.91	5.37	10.19	2.94	5.76
NMP 91228	Troodos Forest	f	a	7.1	46	50	37.7	38.0	18.3	16.23	15.15	8.55	3.28	8.29	5.23	3.62	5.90	5.38	10.19	3.04	5.76
NMP 91268	Agırdağ	f	s/a	7.0	46	47	38.0	38.0	18.7	16.54	15.38	8.54	3.19	8.18	5.42	3.69	6.13	5.54	10.31	2.97	5.74
Miniopterus schreibersii																					
NMP 90402	Troodos Forest	m	s	9.2	51	63	44.2	12.3	5.4	–	–	–	–	–	–	–	–	–	–	–	–
NMP 90403	Troodos Forest	m	a	9.8	52	59	44.8	13.7	6.0	–	–	–	–	–	–	–	–	–	–	–	–
NMP 90404	Troodos Forest	m	a	10.8	55	62	45.4	12.6	5.6	15.00	14.61	8.54	3.56	7.71	6.34	4.58	6.22	5.88	10.54	2.46	6.31
NMP 90405	Troodos Forest	m	a	10.6	55	62	45.3	13.5	5.8	15.21	14.77	8.72	3.68	7.98	6.47	4.68	6.36	5.93	10.77	2.68	6.33
NMP 90406	Troodos Forest	m	a	10.7	58	64	44.8	13.5	5.9	15.02	14.57	8.71	3.66	6.52	6.50	4.67	6.37	5.96	10.72	2.57	6.29
NMP 90434	Kalavasos	m	a	10.6	55	62	44.9	12.4	5.5	15.02	14.51	8.54	3.61	7.80	6.33	4.59	6.37	5.90	10.64	2.51	6.32
NMP 91207	Akamas	f	s	–	53	61	46.0	10.0	6.0	14.79	14.41	8.53	3.41	7.71	6.09	4.59	6.39	5.93	10.54	2.43	6.29
NMP 91253	Akamas	f	s	10.0	50	59	45.3	11.3	5.7	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91254	Akamas	f	s	9.0	52	60	44.5	10.5	5.3	14.77	14.38	8.61	3.57	7.84	6.12	4.54	6.34	5.84	10.47	2.41	6.22
NMP 91255	Akamas	f	s	10.0	53	60	44.2	10.2	5.6	14.67	14.39	8.58	3.57	7.91	6.28	4.61	6.32	5.87	10.46	2.51	6.24
NMP 91256	Akamas	m	–	12.0	52	59	44.4	10.3	5.0	14.84	14.47	8.63	3.68	7.87	6.34	4.72	6.27	5.83	10.52	2.51	6.24
NMP 91257	Akamas	f	–	10.0	59	60	44.4	10.7	6.3	14.63	14.28	8.53	3.57	7.86	6.34	4.54	6.33	5.83	10.46	2.48	6.24
NMP 91258	Akamas	m	–	10.0	57	58	43.8	11.5	5.8	15.18	14.68	8.73	3.53	8.02	6.36	4.63	6.37	5.94	10.71	2.43	6.33
NMP 91259	Akamas	f	–	9.0	55	58	44.5	11.2	5.8	14.67	14.28	8.58	3.64	7.76	6.18	4.62	6.31	5.83	10.53	2.44	6.21
NMP 91260	Akamas	m	–	9.0	57	59	45.0	11.3	6.4	15.02	14.49	8.48	3.56	7.88	6.23	4.53	6.37	5.89	10.67	2.47	6.27
NMP 91265	Troodos Forest	m	–	10.0	52	53	44.2	11.7	6.2	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91266	Troodos Forest	m	–	–	57	56	44.2	11.4	6.5	14.89	14.51	8.54	3.52	7.64	6.27	4.64	6.41	5.89	10.62	2.45	6.27
NMP 91267	Troodos Forest	m	–	–	54	57	44.5	10.6	6.7	14.81	14.36	8.58	3.62	7.83	6.31	4.54	6.42	5.85	10.71	2.46	6.27
NMP 91826	Akamas	f	–	9.5	59	58	45.0	11.3	5.8	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91828	Akamas	m	–	–	56	56	44.7	10.2	5.3	–	–	–	–	–	–	–	–	–	–	–	–
NMP 91829	Akamas	f	–	13.0	54	57	46.0	11.0	6.0	–	–	–	–	–	–	–	–	–	–	–	–
Tadarida teniotis																					
NMP 91831	Paramytha	m	a	–	–	–	–	–	–	23.02	23.71	14.08	4.62	11.75	7.44	5.48	9.33	9.06	17.18	4.04	9.76