

BAT FAUNA OF JORDAN

Research Report – October 2004 & October 2008

Petr BENDA^{1,2)}, Radek K. LUČAN²⁾, Ján OBUCH³⁾ & Ehab Khalil EID⁴⁾

¹⁾ Department of Zoology, National Museum (Natural History), Václavské nám. 68, CZ–115 79 Praha 1, Czech Republic

²⁾ Department of Zoology, Faculty of Science, Charles University in Prague, Viničná 7, CZ–128 44 Praha 2, Czech Republic

³⁾ Botanical Garden, Comenius University, SK–038 15 Blatnica, Slovakia

⁴⁾ The Royal Society for the Conservation of Nature, Research and Survey Section, P. O. Box 1215, Jubaiha 11941, Jordan

During two field trips in October 2004 and October 2008 was studied bat fauna of the Hashemite Kingdom of Jordan. The list below brings the new data on the bat distribution in Jordan obtained during these trips and notes concerning these data.

The list of records (arranged in chronological order) includes, for each item, the following information: name of the locality (each record is primarily listed by a name of nearest settlement or notable physical feature) [in brackets, number of locality as indicated in the map], and/or description of record site, date, number of recorded bats with indication of their sex, age and physiological condition.

ABBREVIATIONS. a = adult; det. = detected by a bat detector; f = female; G = pregnant; j = juvenile; m = male; net. = netted; obs. = observed; rec. = a call recording collected; s = subadult.

LIST OF SPECIES RECORDED

***Rousettus aegyptiacus* (Geoffroy, 1810)**

RECORDS. Hammamat Ma'in, near the Dead Sea bank, 22 October 2004: net. 1 fs. – Wadi As Sir, Iraq Al Amir, artificial caves, 10 October 2008: obs. a colony of ca. 30–50 inds., net. 6 fa+j, 1 fa, 6 fs. – Al Mustaba, above a spring in valley slope, 11 October 2008: net. 1 fs. – Kufrinja, Iraq Al Wahaj Cave, 25 October 2008: obs. a large colony, at least 10 inds. in *Strix aluco* pellets.

COMMENTS. *R. aegyptiacus* is a relatively common bat species, its records come mainly from the Mediterranean part of the country and from the Rift Valley to the north from the Dead Sea. Around ten record sites were described from that area (Kock 1969, Kock & Nader 1979, Qumsiyeh 1980, 1996, Qumsiyeh et al. 1986, 1998, Amr et al. 1987, Amr & Disi 1988, Benda & Sádlová 1999, Al-Omari et al. 2000). Our records fell into the known range of the species; large colony was discovered in a large cave near Ajlun (Iraq Al Wahaj Cave at Kufrinja), where fruit bats also represented significant part of the owl food evidenced.

***Rhinopoma cystops* Thomas, 1903**

RECORDS. Wadi As Sir, Iraq Al Amir, artificial caves, 10 October 2008: small colony (obs. 3 inds.), net. 1 ma. – Wadi Mujib, siq estuary, 16 October 2008: det. & rec. numerous inds. – Ghawr As Safi, Lot's Cave, 18 October 2008: obs. small colony of ca. 10 inds. – Tabaqat Fahl, small cave in the Roman necropolis, 25 October 2008: obs. 1 ind. – Wadi Ibn Hammat, at a river in rocky canyon, 23 October 2008: det. & rec. calls of 1 ind.

COMMENTS. *R. cystops* was formerly considered a species belonging closely to its Indian congener, *R. hardwickii*, however, its separate status was well proved (Hulva et al. 2007). *R. cystops* is known from several sites (up to six) of western regions of Jordan adjacent to the Rift Valley, both in northern and southern Jordani portions (Harrison 1959, 1964, Atallah 1977, Qumsiyeh et al. 1992, 1998, Benda & Sádlová 1999, Amr et al. 2004). Our records come mostly from the area of known distribution range of this species in Jordan, most notable is the record from Iraq al Amir, a place of the rather Mediterranean zone, situated more than 500 m a. s. l.

***Taphozous perforatus* Geoffroy, 1818**

RECORDS. Hammamat Ma'in, near the Dead Sea bank, 22 October 2004: net. 1 m, det. & rec. calls of numerous inds.

COMMENTS. Our findings represent the second record of *T. perforatus* from Jordan, the only previously published record comes from a place 2 km E of Ghor es-Safi (Qumsiyeh et al. 1992).

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

RECORDS. Zubiya, Zubiya Cave, 25 October 2008: obs. torpid & coll. 1 ms, 1 fa, 1 fs. – Dibbine Forest, system of underground spaces and corridors, 27 October 2008: obs. torpid 4 ma, 1 fa.

COMMENTS. *R. ferrumequinum* is one of the most common cave dwelling bats of Jordan. At least eight record sites were published from the Mediterranean zone of the country (Harrison 1959, 1964, Atallah 1977, Felten et al. 1977, Nader & Kock 1983, Qumsiyeh et al. 1986, 1992, 1998, Amr & Disi 1988, Harrison & Bates 1991, Qumsiyeh 1996). Both the record sites reported here belong to well known Jordanian occurrence localities of *R. ferrumequinum*; from Zubiya forest was this species reported already by Qumsiyeh et al. (1992) and from the Dibbine forest it was previously collected by Qumsiyeh et al. (1986, 1998) and Amr & Disi (1988).

***Rhinolophus hipposideros* (Borkhausen, 1797)**

RECORDS. Dibbine Forest, system of underground spaces and corridors, 27 October 2008: obs. torpid 3 m, 3 fa, 2 fs.

COMMENTS. *R. hipposideros* is not really common bat species in Jordan, only two sites of occurrence were reported previously, the Dibbine National Park (Qumsiyeh 1980, Qumsiyeh et al. 1986, 1992, 1998, Amr & Qumsiyeh 1993) and the Zubiya forest (Qumsiyeh et al. 1992). We confirmed a continuation of occurrence of this species in the former site.

***Rhinolophus euryale* Blasius, 1853**

RECORDS. Zubiya, Zubiya Cave, 25 October 2008: obs. a colony of ca. 25 inds. (examined 3 inds.).

COMMENTS. Similarly as in the previous species, *R. euryale* was known only from two sites in the Mediterranean zone of Jordan (Harrison 1972, Atallah 1977, Qumsiyeh 1985, Harrison & Bates 1991). Here we report another place of occurrence from the same region of the country.

***Rhinolophus blasii* Peters, 1866**

RECORDS. As Shawbak Castle, underground corridor, 20 October 2008: obs. a colony of 20 inds. – Dibbine Forest, system of underground spaces and corridors, 27 October 2008: obs. active 1 ind. of *R. cf. blasii*.

COMMENTS. *R. blasii* belongs to the rather common bat species of Jordan, its records are known from all areas adjacent to the Rift Valley, at least six records were reported from that area (Qumsiyeh 1980, Qumsiyeh et al. 1986, 1992, 1998, Amr & Disi 1988, Amr & Qumsiyeh 1993, Qumsiyeh 1996). We found larger colony of this bat in an underground corridor of the As Shawbak castle, where it roosted together with a colony of *Myotis nattereri*.

***Myotis blythii* (Tomes, 1857)**

RECORD. Kufrinja, Iraq Al Wahaj Cave, 25 October 2008: mandible rest found in *Strix aluco* pellet.

COMMENTS. *M. blythii* was never reported from the territory of Jordan, although it was expected there (Qumsiyeh et al. 1992). The finding of a mandible fragment in the owl pellets represents the first record of this species in the country.

***Myotis nattereri* (Kuhl, 1817)**

RECORDS. Wadi As Sir, Iraq Al Amir, artificial cave, 10 October 2008: net. 1 ma, det. & rec. calls of 1 ind. – Dana Reserve, artificial water birdpool ca. 1 km E of the Rummana Camp, 19 October 2008: net. 1 fa, det.

& rec. calls of 3 inds. – As Shawbak Castle, underground corridor, 20 October 2008: obs. a colony of 10 inds. torpid.

COMMENTS. Until now, *M. nattereri* was known only from one site in Jordan, it was repeatedly reported from the Dibbine National Park (Qumsiyeh 1980, Amr & Disi 1988, Amr & Qumsiyeh 1993, Qumsiyeh et al. 1998). Our new records significantly extended the known distribution range of this bat not only in Jordan but also in the whole Middle East, being the southernmost in the Levant. Records from As Shawbak and Dana reserve belong to a newly discovered population of pale individuals of *M. nattereri*, differing from those inhabiting the Mediterranean zone of Jordan, Palestine and Syria.

***Eptesicus bottae* (Peters, 1869)**

RECORDS. Wadi Rum, Lawrence's Pool, 24–25 October 2004: net. 1 ms, 2 fa (cf. Benda et al. 2006). – Jebel Masuda, Ain Rashrash, 21 October 2008: det. & rec. calls of 1 foraging ind.

COMMENTS. *E. bottae* is a bat species known only from south-western part of Jordan, where it was reported from four sites at least (Bates & Harrison 1989, Qumsiyeh et al. 1992, Disi & Hatough-Bouran 1999, Al-Omari et al. 2000, Amr et al. 2004). Our records come from the known Jordani distribution range of the species.

***Hypsugo ariel* (Thomas, 1904)**

RECORDS. Wadi Rum, Lawrence's Pool, 24–25 October 2004: net. 1 ms (cf. Benda et al. 2008). – Wadi Mujib, siq estuary, 16 October 2008: det. & rec. several inds. – Tall Numiera, at water pools, 17 October 2008: net. 1 ma, 1 fa, 1 fs, det. & rec. numerous inds. – Jebel Masuda, Ain Rashrash, 21 October 2008: det. & rec. calls of ca. 10 foraging inds. – Wadi Ibn Hammat, at a river in rocky canyon, 23 October 2008: det. & rec. calls of 1 ind.

COMMENTS. This species, formerly known as *Pipistrellus bodenheimeri* and/or *Pipistrellus ariel* was reported from three sites in south-western Jordan (Qumsiyeh et al. 1992, Disi & Hatough-Bouran 1999). Our records, represented mainly by call recordings, come from the known area and slightly extend the Jordani range to north.

***Pipistrellus kuhlii* (Kuhl, 1817)**

RECORDS. Zarqa River above the King's Talal Dam, 21 October 2004: det. numerous inds. – Wadi As Sir, Iraq Al Amir, at artificial caves, 10 October 2008: det. & rec. numerous foraging inds. – Al Mustaba, above a spring in valley slope, 11 October 2008: det. & rec. several foraging inds. – Qasr Kharana, wall fissure of the first floor of ancient fortress, 12 October 2008: coll. 1 ma. – Quseir Amra, at the ancient bath, 12 October 2008: det. & rec. 1 ind. – Hammam As Sarh, fissures in vaulted ceiling of the ancient bath, 13 October 2008: obs. 8 inds. – Qasr Azraq, fissure in the ceiling of mosque, 13 October 2008: obs. 2 inds. – Azraq wetland, at a dam between two ponds, 13 October 2008: net. 6 ma, 1 ms, 1 fa, 2 fs, 2 s.i., det. & rec. calls of several inds. – Yarmuk, Wadi Al Kurasi, 26 October 2008: det. & rec. numerous inds.

COMMENTS. *P. kuhlii* is certainly the most common bat species of the Mediterranean and mainly semi-desert zones of Jordan. Although it was previously reported only from rather limited localities throughout the northern portion of the country (both Mediterranean and desert) (Atallah 1966, 1967, 1977, Qumsiyeh et al. 1992, 1998, Darweesh et al. 1997), our research proved this species to be widely distributed in semi-deserts to east of Amman. The roosts of *P. kuhlii* were found in many places, at least in two sites also roosts of colonies, probably remaining from the nursery ones.

***Otonycteris hemprichii* Peters, 1859**

RECORDS. Qasr Kharana, ground floor dark room of the ancient floor, 12 October 2008: coll. 1 ma. – Quseir Amra, at the ancient bath, 12 October 2008: det. & rec. 1 ind. – Qasr Burqu, at the ancient fortress ruins, 14 October 2008: net. 1 ma, 1 ms, 1 fa, det. & rec. several inds. – Dana Reserve, ca. 1 km E of the Rummana Camp, 19 October 2008: det. & rec. calls of 1 ind. – Dana Reserve, rocky wall ca. 1 km NW of the Rummana Camp,

19 October 2008: a mandible from *Athene noctua* pellet. – Jebel Masuda, at a spring in the easternmost extension of the Wadi Al Abiat, 22 October 2008: det. & rec. calls of 2–3 inds.

COMMENTS. *O. hemprichii* is a desert bat species, known from two separate areas of Jordan; rather numerous records come from western and south-western parts of the country (Bates & Harrison 1989, Qumsiyeh et al. 1992, 1998, Al-Omari et al. 2000) and isolated records were reported from north-eastern corner of the Jordan territory (Atallah 1966, 1967, Qumsiyeh et al. 1998). We bring records from both areas of the Jordani range and moreover, the record from Qasr Kharana interconnects these parts of the range.

***Plecotus christii* Gray, 1838**

RECORDS. Wadi Rum, Lawrence's Pool, 24–25 October 2004: net. 2 ma (cf. Benda et al. 2006, 2008). – Dana Reserve, artificial sandstone caves ca. 2 km E of the Rummana Camp, 18 October 2008: net. 1 ma, 1 fa. – As Shawbak Castle, underground corridor, 20 October 2008: obs. 5 inds. torpid.

COMMENTS. *P. christii* was previously reported from Jordan under a name *P. austriacus*, an European form which does not occur in Asia. Four records are known from south-western desert part of the country (Qumsiyeh et al. 1992, 1998, Qumsiyeh 1996, Disi & Hatough-Bouran 1999). Our records reported here belong to the known Jordani distribution range of the species.

***Barbastella leucomelas* (Cretzschmar, 1830)**

RECORDS. Jebel Masuda, at a spring in the easternmost extension of the Wadi Al Abiat, 22 October 2008: det. & rec. calls of 1 ind.

COMMENTS. *B. leucomelas* is a bat species endemic to deserts of the southern Levant and Sinai and from Jordan it was never reported (several records are known from southern Palestine and from Sinai, see Benda et al. 2008). Here we bring the first record of this species from the country. The call record of *B. leucomelas* from Jebel Masuda from rather extreme site in almost 1000 m a. s. l. well resembles the area of occurrence in central Sinai, from where this species was described and repeatedly reported (Benda et al. 2008).

***Tadarida teniotis* (Rafinesque, 1814)**

RECORDS. Hammamat Ma'in, near the Dead Sea bank, 22 October 2004: det. 1 ind. – Wadi Rum, Lawrence's Pool, 24–25 October 2004: repeatedly det. several inds. – Red Sea shore, ca. 10 km S of Aqaba, 26 October 2004: repeatedly det. – Quseir Amra, at the ancient bath, 12 October 2008: det. & rec. 1 ind. – Qasr Burqu, at the ancient fortress ruins, 14 October 2008: det. & rec. repeatedly calls of an ind. – Wadi Mujib, siq estuary, 16 October 2008: det. 1 ind. – Tall Numiera, at water pools, 17 October 2008: det. & rec. at least 1 ind. – Dana Reserve, ca. 1 km E of the Rummana Camp, 19 October 2008: det. 1 ind. – Jebel Masuda, at a spring in the easternmost extension of the Wadi Al Abiat, 22 October 2008: repeatedly det. & rec. calls of 1 ind.

COMMENTS. Although *T. teniotis* is a species generally considered to belong to the Mediterranean elements, its distribution range in Jordan resembles well that of *O. hemprichii*, a strictly desert dwelling bat species. At least eight records are known from Jordan coming both from western and south-western parts and from north-eastern corner of the country (Atallah 1966, 1967, Qumsiyeh 1980, Qumsiyeh et al. 1992, 1998, Qumsiyeh 1996, Al-Omari et al. 2000). Our new records, which seem to be rather numerous due to the research method used, come exactly from these two parts of distribution area of Jordan.

CONCLUSION

We report here new records of 16 bat species from Jordan. 14 of them were already known from the country, however, two species – *Myotis blythii* and *Barbastella leucomelas* – are here reported from Jordan for the first time. In both these species the range in Jordan significantly extend the known distribution areas in the Levant. From other species recorded, most notable

are the findings of *Taphozous perforatus* and *Myotis nattereri*, both previously reported only from one site in Jordan.

REFERENCES

- AL-OMARI K. A., ABU BAKER M. A. & AMR Z. S. 2000: First record of the Egyptian Slit-faced Bat, *Nycteris thebaica*, from Jordan. *Zoology in the Middle East* **21**: 5–7.
- AMR Z. S. 2000: *Mammals of Jordan. Jordan Country Study on Biological Diversity*. Amman: United Nations Environment Programme, 100 pp.
- AMR Z. S. & DISI A. M. 1988: *Jordanian Mammals Acquired by the Jordan University Natural History Museum*. Amman: University of Jordan, 32 pp.
- AMR Z. S. & QUMSIYEH M. B. 1993: Records of bats flies from Jordan, Libya and Algeria. *Entomological News* **104**: 43–46.
- AMR Z. S., WOODBURY S & DISI A. 1987: On a collection of mammals from Jordan. *Dirasat* **14B**: 131–136.
- AMR Z., ABU BAKER M. & RIFAI L. 2004: Mammals of Jordan. Pp.: 437–465. In: WAITZBAUER W., ALBERT R., PETUTSCHNIG B. & AUBRECHT G. (eds.): *Denisia 14. Reise durch die Natur Jordaniens*. Linz: Biologiezentrum/Oberösterreichische Landesmuseen, 508 pp.
- ATALLAH S. I. 1966: Mammalogy. P.: 664. In: BOYD J. M. (ed.): International Jordan Expedition 1966. *Nature* **212**: 663–665.
- ATALLAH S. I. 1967: Mammalogy (with a list of reptiles and amphibians). Pp.: 56–63. In: *International Jordan Expedition 1966*. London: International Biological Program/CT Section.
- ATALLAH S. I. 1977: Mammals of the Eastern Mediterranean Region; their Ecology, Systematics and Zoogeographical Relationships. *Säugetierkundliche Mitteilungen* **25**: 241–319.
- BATES P. J. J. & HARRISON D. L. 1989: New records of small mammals from Jordan. *Bonner Zoologische Beiträge* **40**: 223–226.
- BENDA P. & SÁDLOVÁ J. 1999: New records of small mammals (Insectivora, Chiroptera, Rodentia, Hyracoidea) from Jordan. *Časopis Národního Muzea, Řada Přírodovědná* **168**: 25–36.
- BENDA P., DIETZ C., ANDREAS M., HOTOVÝ J., LUČAN R. K., MALTBY A., MEAKIN K., TRUSCOTT J. & VALLO P. 2008: Bats (Mammalia: Chiroptera) of the Eastern Mediterranean and Middle East. Part 6. Bats of Sinai (Egypt) with some taxonomic, ecological and echolocation data on that fauna. *Acta Societatis Zoologicae Bohemicae* **72**: 1–103.
- BENDA P., ANDREAS M., KOCK D., LUČAN R. K., MUNCLINGER P., NOVÁ P., OBUCH J., OCHMAN K., REITER A., UHRIN M. & WEINFURTOVÁ D. 2006: Bats (Mammalia: Chiroptera) of the Eastern Mediterranean. Part 4. Bat fauna of Syria: distribution, systematics, ecology. *Acta Societatis Zoologicae Bohemicae* **70**: 1–329.
- DARWEESH N., AL-MELHIM W. N., DISI A. M. & AMR Z. S. 1997: First record of the naked-bellied tomb bat, *Taphozous nudiventris* Cretzschmar, 1830, from Jordan. *Zoology in the Middle East* **15**: 13–14.
- DISI A. M. & HATOUGH-BOURAN A. 1999: Biodiversity of the terrestrial vertebrate fauna of Petra (Jordan). *Časopis Národního Muzea, Řada Přírodovědecká* **168**: 83–98.
- FELTEN H., SPITZENBERGER F. & STORCH G. 1977: Zur Kleinsäugerfauna West-Anatoliens. Teil IIIa. *Senckenbergiana Biologica* **58**: 1–4.
- HARRISON D. L. 1959: *Footsteps in the Sand*. London: Ernest Benn Limited, 256 pp.
- HARRISON D. L. 1964: *The Mammals of Arabia. Volume I. Introduction. Insectivora – Chiroptera – Primates*. London: Ernest Benn Limited, xviii+192 pp.
- HARRISON D. L. 1972: *The Mammals of Arabia. Volume III. Lagomorpha – Rodentia*. London: Ernest Benn Limited, xvii+[288] pp.
- HARRISON D. L. & BATES P. J. J. 1991: *The Mammals of Arabia. Second Edition*. Sevenoaks: Harrison Zoological Museum, 354 pp.
- HULVA P., HORÁČEK I. & BENDA P. 2007: Molecules, morphometrics and new fossils provide an integrated view of the evolutionary history of Rhinopomatidae (Mammalia: Chiroptera). *BioMed Central Evolutionary Biology* **7** (165): 1–15.
- KOCK D. 1969: Die Fledermaus-Fauna des Sudan. *Abhandlungen der Senckenbergische Naturforschende Gesellschaft* **521**: 1–238.
- KOCK D. & NADER I. A. 1979: Two bat flies from the Kingdom of Saudi Arabia, their nomenclature, host specificity and zoogeography (Insecta: Diptera: Nycteribiidae). *Senckenbergiana Biologica* **60**: 65–73.
- NADER I. A. & KOCK D. 1983: Notes on some bats from the Near East (Mammalia: Chiroptera). *Zeitschrift für Säugetierkunde* **48**: 1–9.
- QUMSIYEH M. B. 1980: New records of bats from Jordan. *Säugetierkundliche Mitteilungen* **28**: 36–39.
- QUMSIYEH M. B. 1985: The bats of Egypt. *Special Publication of the Museum of Texas Tech University* **23**: 1–101.
- QUMSIYEH M. B. 1996: *Mammals of the Holy Land*. Lubbock: Texas Tech University Press, x+389 pp.
- QUMSIYEH M. B. & BAKER R. J. 1985: G- and C-banded karyotypes of the Rhinopomatidae (Microchiroptera). *Journal of Mammalogy* **66**: 541–544.
- QUMSIYEH M. B., SCHLITTER D. A. & DISI A. M. 1986: New records and karyotypes of small mammals from Jordan. *Zeitschrift für Säugetierkunde* **51**: 139–146.

QUMSIYEH M. B., DISI A. M. & AMR Z. S. 1992: Systematics and distribution of the bats (Mammalia: Chiroptera) of Jordan. *Dirasat* **19B**: 101–118.

QUMSIYEH M. B., AMR Z. S. & AL-ORAN R. M. 1998: Further records of bats from Jordan and a synopsis. *Turkish Journal of Zoology* **22**: 277–284.

GAZETTEER (sites of the 2008 trip only)

Wadi As Sir, Iraq Al Amir, artificial caves, 31° 55' N, 35° 45' E, 515 m a. s. l. – Al Mustaba, spring in valley slope, 32° 13' N, 35° 53' E, 285 m a. s. l. – Qasr Kharana, ancient fortress, 31° 44' N, 36° 28' E, 656 m a. s. l. – Quseir Amra, ancient bath, 31° 48' N, 36° 35' E, 570 m a. s. l. – Hammam As Sarh, ancient bath, 32° 05' N, 36° 22' E, 595 m a. s. l. – Qasr Azraq, 31° 53' N, 36° 50' E, 523 m a. s. l. – Azraq wetland, 31° 50' N, 36° 49' E, 515 m a. s. l. – Qasr Burqu, ancient fortress ruins, 32° 37' N, 37° 58' E, 651 m a. s. l. – Wadi Mujib, siq estuary, 31° 28' N, 35° 34' E, –385 m a. s. l. – Tall Numiera, at water pools, 31° 08' N, 35° 32' E, –345 m a. s. l. – Ghawr As Safi, Lot's Cave, 31° 03' N, 35° 30' E, –262 m a. s. l. – Dana Reserve, artificial sandstone caves ca. 2 km E of the Rummana Camp, 30° 41' N, 35° 35' E, 1235 m a. s. l. – Dana Reserve, artificial water birdpool ca. 1 km E of the Rummana Camp, 31° 41' N, 35° 35' E, 1177 m a. s. l. – As Shawbak Castle, 30° 32' N, 35° 34' E, 1278 m a. s. l. (castle entrance 1402 m a. s. l.). – Jebel Masuda, Ain Rashrash, 30° 12' N, 35° 23' E, 645 m a. s. l. – Jebel Masuda, a spring in the easternmost extension of the Wadi Al Abiat, 30° 07' N, 35° 22' E, 974 m a. s. l. – Zubiya, Zubiya Cave, 32° 26' N, 35° 45' E, 812 m a. s. l. – Tabaqat Fahl, small cave in the Roman necropolis, 32° 27' N, 35° 37' E, –8 m a. s. l. – Kufrinja, Iraq Al Wahaj Cave, 32° 19' N, 35° 43' E, 741 m a. s. l. – Yarmuk, Wadi Al Kurasi, 32° 41' N, 35° 43' E, 131 m a. s. l. – Dibbine Forest, system of underground spaces and corridors, 32° 14–15' N, 35° 49–50' E, 645–790 m a. s. l.